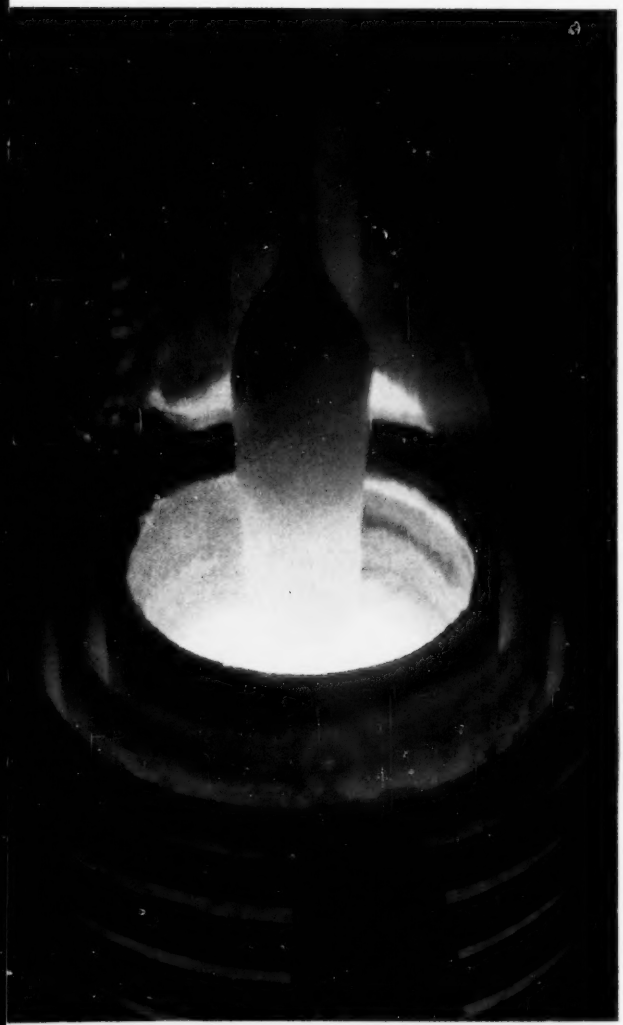
Chemical Week

January 18, 1958

Price 35 cents



Critical week for the nation.

As Congress gathered for the State of Union Message, three issues were paramount:

1. RUSSIA
2. RECESSION
3. ROCKETS

Their impact on the outlook for chemical business . p. 22

Making high-purity silicon.

The new producers favor European processes . . p. 54

Fertilizer firm turns up an eye-opener in market research quiz of farmers . p. 82

A McGRAW-HILL PU

ANN ARBOR MICH
313 N 1ST ST
UNIVERSITY MICROFILMS IN
S P POWER

Ölsüss or γλυκὺς ... *here's where we make it!*

"Ölsüss" by another name is still the "sweet essence of oils" its brilliant discoverer, Karl Wilhelm Scheele, described in 1783. And "ölsüss" does have another name today, *glycerine*—from the Greek word γλυκὺς meaning "sweet."

Since 1948, Shell Chemical has been making high-quality glycerine from the products of petroleum. Glycerine is used in more than 1500 ways and by almost every industry—in cellophane, medicines, cosmetics, explosives, tobacco—and in the alkyd resins that form the basis of superior new enamels.

Pioneering the development and manufacture of glycerine from the products of petroleum is another Shell Chemical contribution to industry.

Shell Chemical Corporation

Chemical Partner of Industry and Agriculture

NEW YORK

SHELL

Photo courtesy Sun Rubber Company, Barberton, Ohio

Want an All-Star "Cast" for your production?

A major factor in the success of rotational casting of vinyls is the formulation of the plastisol. It must not only provide the end properties desired, but must have exactly the right viscosity.

Close control of viscosity is the main reason why a leading toy manufacturer used PLIOVIC AO in the compound for his life-like dolls. PLIOVIC AO helps importantly to maintain the fluidity needed during the early stages of molding to assure complete, uniform distribution of the charge.

There are other advantages to PLIOVIC AO, too. It is fully compatible with other materials used. It lowers the fusion temperature. And it improves hot tear strength for safe mold release.

Why not see what you can gain from casting your lot in production with PLIOVIC AO? For full details on this and the other members of the PLIOVIC family, including the latest *Tech Book Bulletins*, just write to Goodyear, Chemical Division, Dept. M-9417, Akron 16, Ohio.

CHEMIGUM
PLIOFLEX
PLIOLITE
PLIOVIC
WING-CHEMICALS

High Polymer Resins, Rubbers, Latices and Related Chemicals for the Process Industries

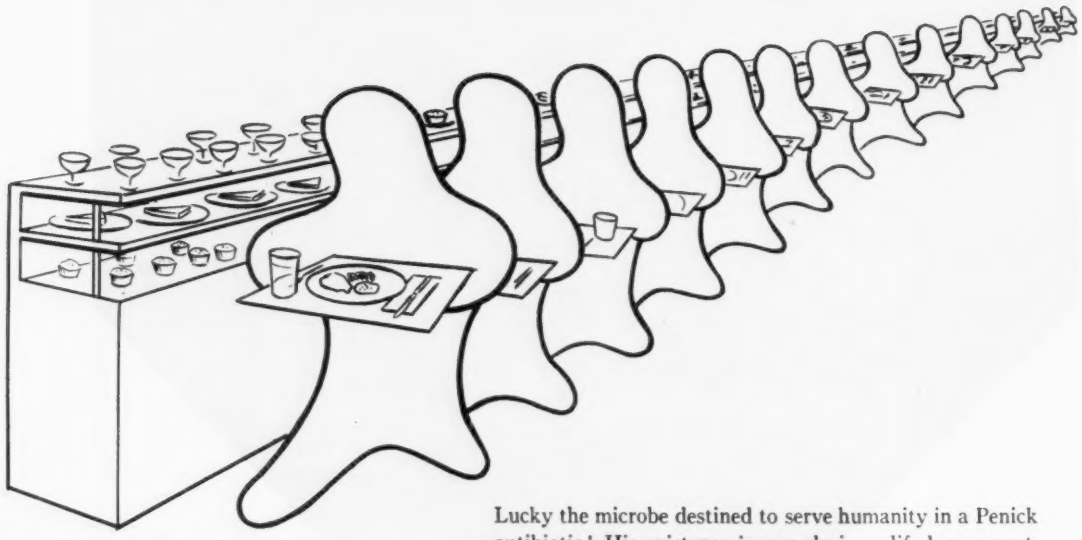
PLIOVIC AO *vinyl dispersion resin*

CHEMICAL GOODYEAR DIVISION

PLASTICS DEPARTMENT

Chemigum, Plioflex, Pliolite, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Feeding 40 billion is no simple fete!



Lucky the microbe destined to serve humanity in a Penick antibiotic! His existence is one glorious, life-long repast, enjoyed in the company of his kinfolk by the billion!

To nurture these microbial multitudes requires the combined resources of a team of Penick scientists . . . bacteriologists, mycologists, fermentation chemists, biochemists and chemical engineers. They serve perfectly balanced diets under ideal, sterile conditions with one dedicated aim: to obtain most economically maximum yields of highly concentrated antibiotics.

Beginning with the manufacture of tyrothricin and gramicidin, Penick has been in the forefront of antibiotic development. Today we manufacture the widest range of specialty antibiotics available, marketing in bulk only for use in pharmaceuticals, veterinary medicines, feed supplements and cosmetics.

In addition, our experienced staff and diversified facilities are available for custom manufacture of mold and bacterial antibiotics and other fermentation products.

We would be pleased to serve you.

PENICK

Manufacturers of Fine Chemicals and Drugs

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 · 735 W. DIVISION ST., CHICAGO 10

Chemical Week

TOP OF THE WEEK **January 18, 1958**

▶ **Tranquilizers as adjuvants may double their market** potential within the next few years ..... **p. 35**

▶ **Build a plant or buy an old one to convert?** USI did the latter, is well-satisfied with results ..... **p. 42**

▶ **Anti-U.S. attitude in Canada may stifle investors' chances** to cash in on boom in Canada's Northwest ..... **p. 48**

15 OPINION

15 MEETINGS

17 BUSINESS NEWSLETTER

22 Congress's opening session and the President's State of the Union message will vitally affect the health of the chemical business in '58.

26 Will chemical unions adopt the employee benefit program already used by coal workers? Right now, they're studying it hard.

26 Royal Dutch Shell lifts the wraps on size of its chemical empire—sales of chemicals totaled $263 million in first nine months of '57.

27 Merck's Prather takes over slot in BDSA.

31 WASHINGTON NEWSLETTER

35 RESEARCH
Tranquilizer makers are probing applications that could double the current $200-million market for their products. Newest idea: tranquilizers as adjuvants to many other drugs.

42 PRODUCTION
Paying off is titanium maker's gamble that a quick purchase of an existing plant would cause enough savings to warrant scrapping new-plant construction plans.

48 ADMINISTRATION
Canada's set for a boom in its mineral-rich Northwest. But it's now casting a dim eye toward potential investors from the U.S.

54 ENGINEERING
Two more producers of high-purity silicon enter the picture, bringing novel foreign processes for purification of the metal and its carbide.

65 TECHNOLOGY NEWSLETTER

69 MARKETS
Chlorine and caustic makers ponder ways to bring caustic consumption into line with production. But present and future picture is poor.

79 MARKET NEWSLETTER

82 SALES
Midwest farmers are put on the spot—What are their attitudes toward fertilizer use and types? The answers offer up-to-the-minute data vital to everyone selling the farm market.

89 SPECIALTIES
Supplier of little-known agave juice thinks he's got a hot product, but he's finding some problems in selling it.

96 CHARTING BUSINESS
U.S. is increasing its share of the fats-and-oils export market.

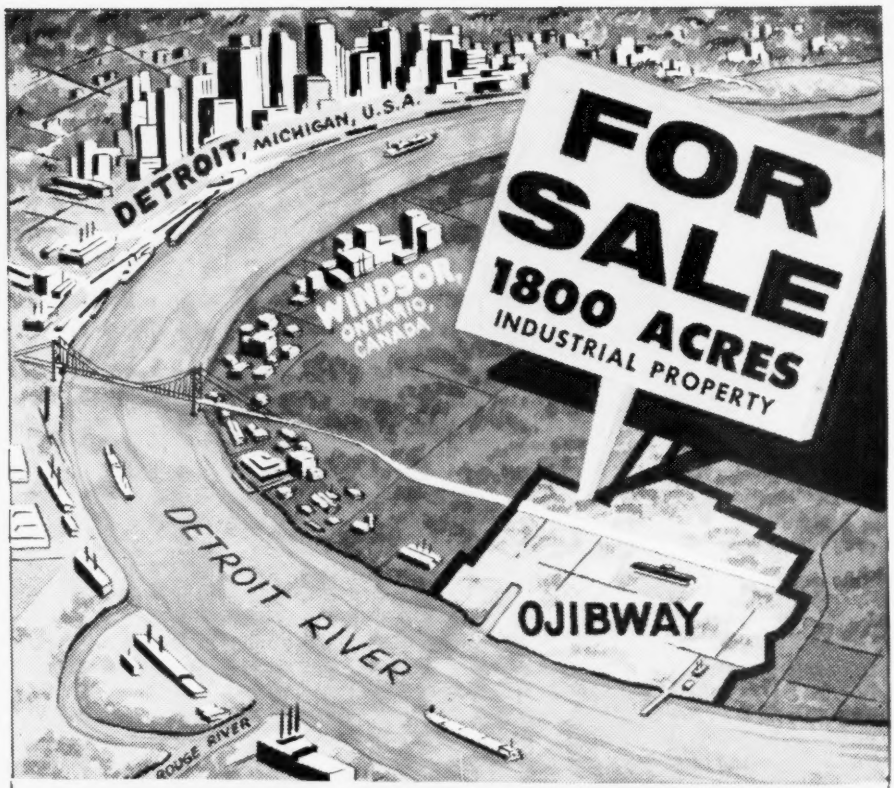
COVER PHOTO: COPYRIGHT 1957, E. I. DU PONT DE NEMOURS & CO. (DU PONT MAGAZINE); PAGE 22, WIDE WORLD, GRANT COMPTON

Vol. 82
No. 3

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., 330 W. 42nd St., New York 36, N.Y. Printed in U.S.A. Second-class mail privileges authorized at Philadelphia, Pa. © Copyright 1958 by McGraw-Hill Publishing Co., Inc. All rights reserved. Subscription: $3/year in U.S.A., U.S. Possessions; $4, Canada; $15, other Western Hemisphere countries; $25, all other countries. Also see p. 10.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N. Y.

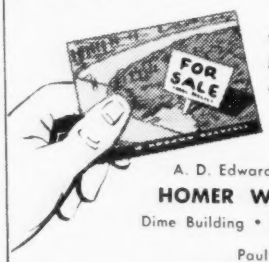
Watch CW Grow — 40,105 copies of this issue printed



ON THE ST. LAWRENCE SEAWAY

This view shows 2500-foot Slip opening on Detroit River . . . the exceptionally level topography of the land . . . the wide river frontage with famed River Rouge industrial section directly across the Detroit River.

- **8,000 FEET OF DETROIT RIVER FRONTAGE**
- **2,500 FOOT DEEP-WATER SLIP**
- **RAILROAD SIDINGS AND ROADWAYS**
  . . . miles of each already built on the property
- **UNLIMITED WATER SUPPLY FROM GREAT LAKES**
- **ABUNDANT ELECTRIC POWER**
  . . . one of Canada's largest generating plants adjoins the property
- **IMMEDIATE POSSESSION**
  . . . one parcel, already assembled under one ownership, offers you quick action



Write one of the Realtors below for brochure giving complete information

A. D. Edwards, Vice-President
HOMER WARREN & CO.
Dime Building • Detroit 26, Michigan

Paul Robarts
FOSTER & ROBARTS
Bartlet Building • 76 University West
Windsor, Ontario, Canada

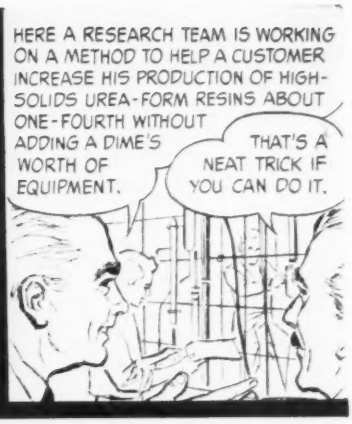
Lester J. Steele, Vice-President
SILLOWAY & COMPANY
Buhl Building • Detroit 26, Michigan

Ojibway, located on the busiest waterway of the world, is within approx. 500-mile radius of Buffalo, New York, Philadelphia, Baltimore, Pittsburgh, Cleveland, Cincinnati, St. Louis, Chicago, Milwaukee, Minneapolis, Montreal and Toronto. Ojibway, world port, is a natural location for all types of industry.

This is NITROGEN DIVISION

MR. SMITH, THIS IS DOC BRANTING, WHO IS IN CHARGE OF TECHNICAL SERVICE.
GLAD YOU CAME TO SEE US, MR. SMITH. HOW ABOUT A TOUR THROUGH THE LAB?

Customer George Smith* visits Allied's Hopewell lab and gets a new slant on a much-used term — technical service. At Nitrogen Division it's as technical as it needs to be, and dedicated to serving customer needs. *He could be you.

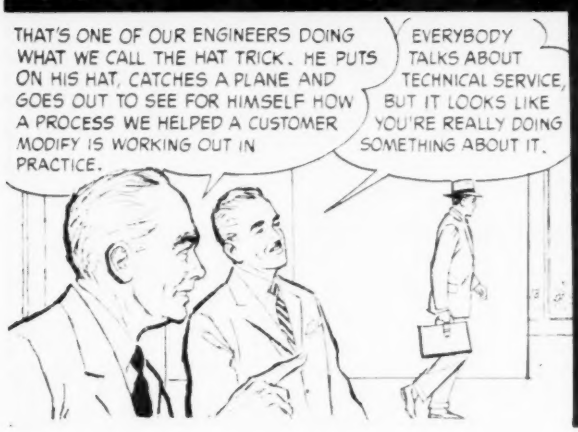

HERE A RESEARCH TEAM IS WORKING ON A METHOD TO HELP A CUSTOMER INCREASE HIS PRODUCTION OF HIGH-SOLIDS UREA-FORM RESINS ABOUT ONE-FOURTH WITHOUT ADDING A DIME'S WORTH OF EQUIPMENT.
THAT'S A NEAT TRICK IF YOU CAN DO IT.

ACTUALLY, MR. SMITH, IT'S DONE WITH A PRODUCT OF OURS CALLED U.F. CONCENTRATE - 85. IT REPLACES FORMALDEHYDE AND UREA, AND OUR WORK HERE WILL SHOW HIM EXACTLY HOW TO FIT IT INTO HIS PROCESS.

U.F. Concentrate-85, a solution of formaldehyde and urea, contains 85% active ingredients. Low diluent content permits charging larger quantities of materials; cuts dehydration time, costs.

OUR SOLE JOB IS TO HELP CUSTOMERS USE NITROGEN DIVISION PRODUCTS TO BEST ADVANTAGE. HERE'S ANOTHER EXAMPLE: ONE OF OUR SALESMEN ASKED FOR CERTAIN TESTS ON ETHANOLAMINES IN A DETERGENT APPLICATION. HE'LL SOON HAVE A FULL REPORT FOR HIS CUSTOMER.

Mono-, di- and triethanolamines are produced in volume at Nitrogen Division's Orange, Texas plant, distributed in quantities ranging from tank cars to drums.


THAT'S ONE OF OUR ENGINEERS DOING WHAT WE CALL THE HAT TRICK. HE PUTS ON HIS HAT, CATCHES A PLANE AND GOES OUT TO SEE FOR HIMSELF HOW A PROCESS WE HELPED A CUSTOMER MODIFY IS WORKING OUT IN PRACTICE.
EVERYBODY TALKS ABOUT TECHNICAL SERVICE, BUT IT LOOKS LIKE YOU'RE REALLY DOING SOMETHING ABOUT IT.

YES, MR. SMITH, WE ARE. THIS LAB, BIGGER THAN THE AVERAGE MANUFACTURING PLANT, IS DEVOTED TO TECHNICAL SERVICE TO OUR CUSTOMERS. AND NOW LET'S GO BACK TO MY OFFICE AND TALK ABOUT YOUR PROBLEM.
Nitrogen Division

Technical service . . . how technical and how much service?

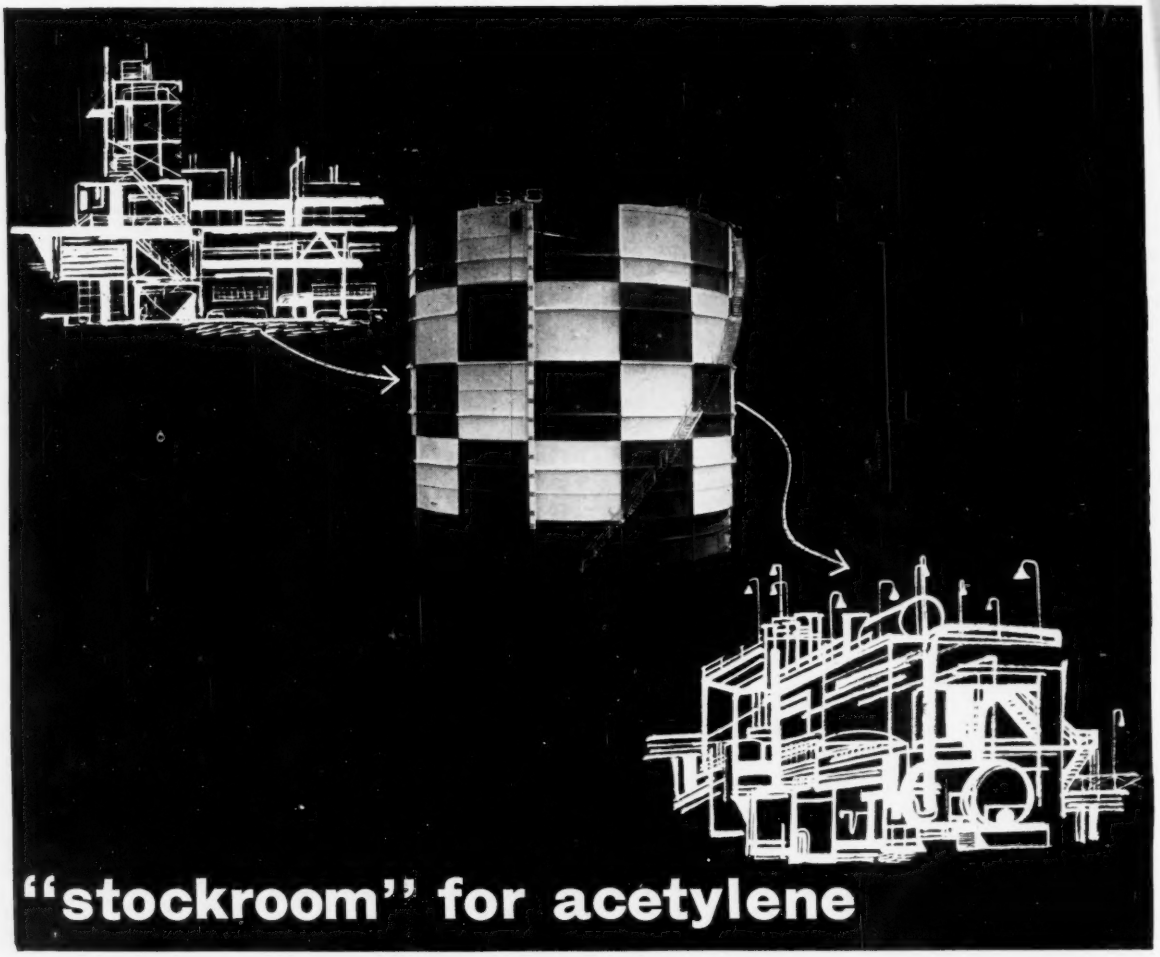
In the chemical field it's a rare advertisement that doesn't conclude with an offer of technical service. At Allied's Nitrogen Division technical service is an important activity. Scores of experts in a big modern laboratory — and in the field — devote their full time to answering technical questions and giving direct assistance to customers on processing problems. How can they help you?

Dept. AP 3-7-2

Allied Chemical — NITROGEN DIVISION

40 Rector Street, New York 6, N. Y.

Ethanolamines • Ethylene Oxide • Ethylene Glycols • Urea • Formaldehyde • U. F. Concentrate—85 • Anhydrous Ammonia • Ammonia Liquor • Ammonium Sulfate • Sodium Nitrate • Methanol • Nitrogen Solutions • Nitrogen Tetroxide • Fertilizers & Feed Supplements



Linde Company* purchases Wiggins Gasholder for storage of acetylene between production and use cycles

Ever since the Linde Company's new acetylene plant in Montague, Michigan went "on stream", a new 100,000-cubic-foot Wiggins Gasholder has played a vital role in the operation. Every cubic foot of acetylene produced passes through the "stockroom" on its way to DuPont for use in the production of Neoprene. The gasholder provides acetylene storage and serves as surge capacity to enable Linde to satisfy both normal and emergency requirements.

If you produce, store or use gases, investigate the advantages of Wiggins Gasholders. They can be built to any capacity—from 50-cubic-feet to a million. Call or write General American for complete information.

*DIVISION OF UNION CARBIDE CORPORATION

WIGGINS VAPOR SEALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street, Chicago 90, Illinois.

Offices in Principal Cities

From Sun's refinery at Marcus Hook, Pa...

FAST, DIRECT DELIVERIES OF ANHYDROUS AMMONIA

New plant, delivering commercial and refrigeration grades, has 300-ton daily capacity.

If your plant is located east of Chicago, particularly in the Industrial and Agricultural Northeast, you have a new, direct source of supply for anhydrous ammonia at Sun Oil Company's Marcus Hook, Pennsylvania, refinery.

The strategic location of Sun's Marcus Hook plant on fast, direct-rail throughways and its high production capacity assure you of quicker deliveries and more reliable delivery service. Find out today how Sun's direct-rail service can help ease your scheduling problem.

STORAGE AND HANDLING OF ANHYDROUS AMMONIA

If you would like information on prices, delivery, or the storage and handling of anhydrous ammonia, call your nearest Sun representative or write to SUN OIL COMPANY, Philadelphia 3, Pa. Dept. CW-1.

Other Sun Petrochemicals: Benzene, Toluene, Xylene, Propylene Polymers, Sulfonate OS, Naphthenic (Sunaptic®) Acids, Liquid Petroleum Polymer (PDO-40).

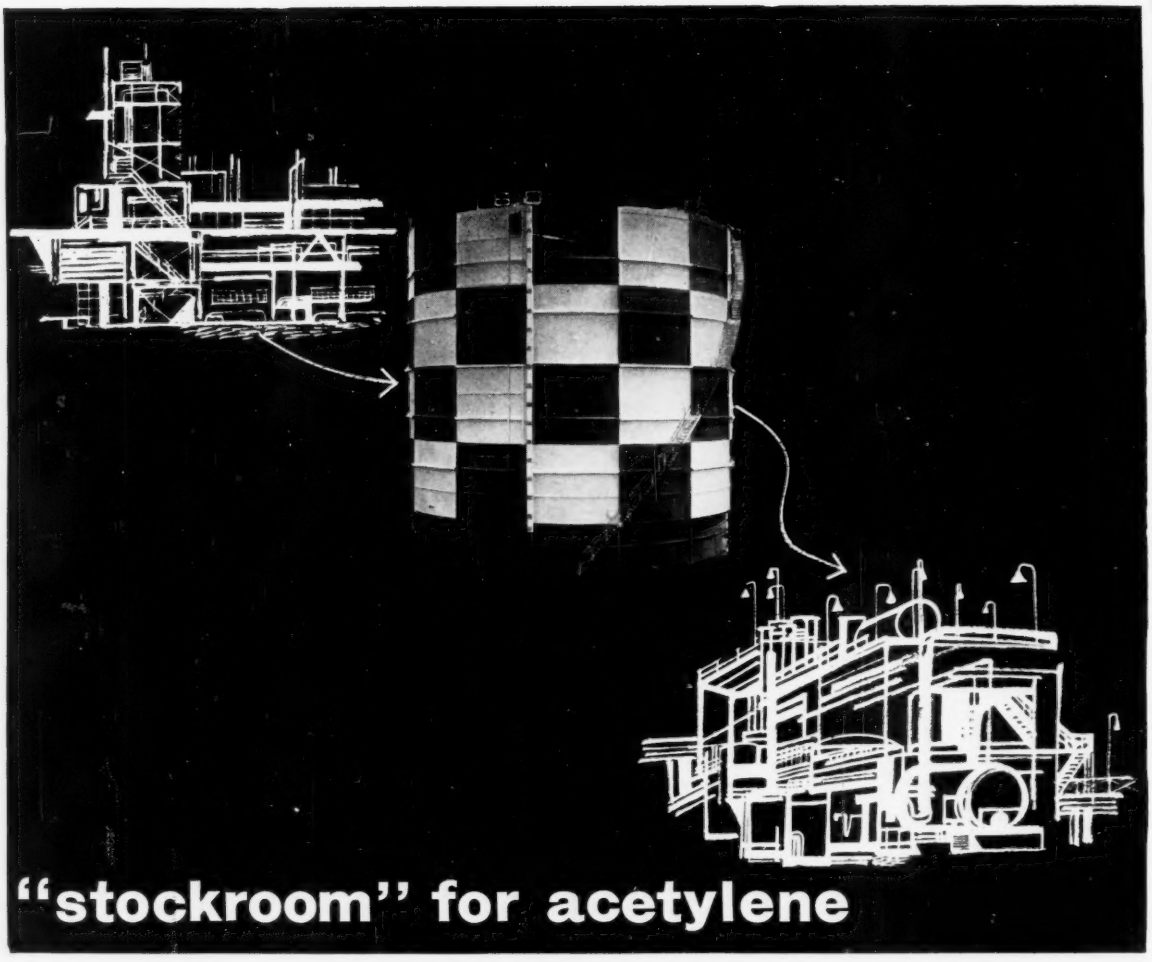
SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

© SUN OIL CO., 1957

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL



Linde Company* purchases Wiggins Gasholder for storage of acetylene between production and use cycles

Ever since the Linde Company's new acetylene plant in Montague, Michigan went "on stream", a new 100,000-cubic-foot Wiggins Gasholder has played a vital role in the operation. Every cubic foot of acetylene produced passes through the "stockroom" on its way to DuPont for use in the production of Neoprene. The gasholder provides acetylene storage and serves as surge capacity to enable Linde to satisfy both normal and emergency requirements.

If you produce, store or use gases, investigate the advantages of Wiggins Gasholders. They can be built to any capacity—from 50-cubic-feet to a million. Call or write General American for complete information.

*DIVISION OF UNION CARBIDE CORPORATION

WIGGINS VAPOR SEALS GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street, Chicago 90, Illinois.
Offices in Principal Cities

From Sun's refinery at Marcus Hook, Pa...

FAST, DIRECT DELIVERIES OF ANHYDROUS AMMONIA

New plant, delivering commercial and refrigeration grades, has 300-ton daily capacity.

If your plant is located east of Chicago, particularly in the Industrial and Agricultural Northeast, you have a new, direct source of supply for anhydrous ammonia at Sun Oil Company's Marcus Hook, Pennsylvania, refinery.

The strategic location of Sun's Marcus Hook plant on fast, direct-rail throughways and its high production capacity assure you of quicker deliveries and more reliable delivery service. Find out today how Sun's direct-rail service can help ease your scheduling problem.

STORAGE AND HANDLING OF ANHYDROUS AMMONIA

If you would like information on prices, delivery, or the storage and handling of anhydrous ammonia, call your nearest Sun representative or write to SUN OIL COMPANY, Philadelphia 3, Pa. Dept. CW-1.

Other Sun Petrochemicals: Benzene, Toluene, Xylene, Propylene Polymers, Sulfonate OS, Naphthenic (Sunaptic[4]) Acids, Liquid Petroleum Polymer (PDO-40).

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

© SUN OIL CO., 1957

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

SULPHUR

helps to create headline products

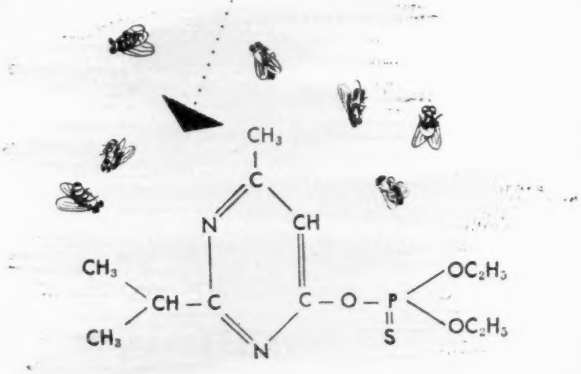
DIAZINON*

What a 'killer' this complex chemical is turning out to be! And quite impartial as to its victims: — houseflies, barnflies, fruitflies, aphids, mites, ants, beetles, chinch bugs, roaches, and many other pests that bother man and beast. It kills them dead!

As with the former chemicals which made such notable headway in man's fight to subdue these destructive pests, Sulphur is very much in the picture—here is one of the many variations of the benzene ring . . . the Diazinon Formula. That letter "S" tied in with the letter "P" discloses the all-important thiophosphate.

Sulphur, often called one of the Four Pillars of the Processing Industry, is benefiting mankind in many ways. None is more important than that of controlling crop-destroying pests.

**A product of the Geigy Chemical Corporation.*



Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N.Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

PICK-UP PACK...ONE-TON SIZE

Each of these Drumpak corrugated containers holds 2000 lbs. of bulk granular chemicals. This same amount was formerly packed in 20 hundred-pound units. By consolidating his product in Drumpaks, this manufacturer reduced handling manhours by 80%. The Drumpak is easy to pick up, warehouse and load into freight cars.

Drumpaks are another Gaylord development. To learn how you can cut costs with any type of corrugated or solid fibre container, contact your nearby Gaylord office.

Gaylord Boxes

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

GAYLORD CONTAINER CORPORATION ★ ST. LOUIS

DIVISION OF CROWN ZELLERBACH CORPORATION

Blockson has the stand-by capacity to stand by its

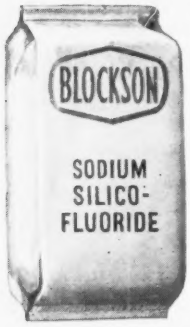
SODIUM SILICO-FLUORIDE

customers

with Blockson as your S S F supplier you can

PLAN AHEAD SAFELY

The largest Sodium Silicofluoride manufacturer, Blockson has stand-by capacity PLUS a plant expansion program that builds well ahead of its customers' increasing needs.



FOR DATA SHEET, TEST SAMPLE, PRICE OR CONTRACT PROPOSAL CALL BLOCKSON OR YOUR BLOCKSON DISTRIBUTOR

P.S. Include SSF with other Blockson chemicals in your mixed-car orders.

BLOCKSON

BLOCKSON CHEMICAL COMPANY
Division of Olin Mathieson Chemical Corporation
Joliet, Illinois

Chemical Week

Publisher Wallace F. Traendly
Editorial Director Sidney D. Kirkpatrick
Editor-in-Chief Howard C. E. Johnson
Managing Editor Ralph R. Schulz
Assistant Managing Editors William Olcott, J. Robert Warren

ASSOCIATE EDITORS
Donald P. Burke, Anthony J. Piombino

DEPARTMENTS

Administration Cooper R. McCarthy, *editor;* Leo J. Northart
Business News Homer Starr, *editor;* Robert L. Porter
Engineering Kenneth C. Wilsey, *editor;* Philip A. Untersee
Markets Jorma Hyypia, *editor;* Frank S. Sciancalepore
Production Herbert C. Short, *editor*
Reports Vincent L. Marsilia, *editor*
Research Joseph F. Kalina, *editor;* Sanford J. Durst
Sales John M. Winton, *editor*
Specialties Richard J. Callahan, *editor;* Mary Thompson
Buyers' Guide Mary C. Folsom, *editor*
Copy William Mullinack, *editor;* Henry S. Gordon
Art R. D. S. Marshall, *director;* Peter Madden

REGIONAL EDITORS
Far West Emil J. Mikity, San Francisco
Southwest James A. Lee, Houston

EDITORIAL ASSISTANTS
Nina Seawick, Frances Regan, Dolores Able, E. L. Sisley

NATIONAL NEWS
Economics Dexter M. Keezer, *director*
Atlanta Charles T. Dixon
Cleveland William Meldrum
Dallas Kemp Anderson, Jr.
Detroit Donald MacDonald
Los Angeles John Shinn
San Francisco Margaret Ralston
Washington George B. Bryant, Jr.
Correspondents in 75 principal cities.

WORLD NEWS
Editor John Wilhelm
Beirut O. M. Marashian
Bonn Morrie Helitzer
London William J. Coughlin
Melbourne Alicja Grobtuch
Mexico City John H. Kearney
Paris Robert E. Farrell
Rio de Janeiro Peter Weaver
Tokyo Dan Kurzman
Correspondents in 61 principal cities

Circulation Manager Paul W. Erb

Advertising Sales Manager Robert S. Muller
Business Manager Alvin J. Babkow
Advertising Makeup Robert L. Maier
Promotion Manager Fred E. Lesner
Market Service Irene Montz
Advertising Salesmen See page 92

JANUARY 18, 1958 **VOL. 82, No. 3**

Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., James H. McGraw (1860-1948), founder. **Executive, Editorial, Circulation** and **Advertising offices:** McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. **Publication office:** 1309 Noble St., Philadelphia 23, Pa. See panel below for directions regarding subscriptions or change of address. Donald C. McGraw, President; Joseph A. Gerardi, Executive Vice President; L. Keith Goodrich, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising Sales; A. R. Venezian, Vice-President and Circulation Coordinator.

Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Position and company connection must be indicated on subscription order. Send to address shown in panel below. United States and United States possessions subscription rate for individuals in the field of the publication, $3 per year; single copies, 35¢. Foreign subscription rates per year: Canada $4; other Western Hemisphere countries, $15; all others, $25, payable in advance. Second-class mail privileges authorized at Philadelphia, Pa. Printed in U.S.A. Title registered in U.S. Patent Office. © Copyright 1958 by McGraw-Hill Publishing Co., Inc. All rights reserved.

Send subscription correspondence and change of address to Subscription Manager, Chemical Week, 330 West 42nd St., New York 36, N. Y. Subscribers should notify Subscription Manager promptly of any change of address, giving old as well as new address, and including postal zone number, if any. If possible, enclose an address label from recent issue of Chemical Week. Please allow one month for change to become effective.

Postmaster: Please send Form 3579 to Chemical Week, 330 West 42nd St., New York 36, N. Y.

mix imagination with Alcoa Aluminas

and dry gases, liquids, vapors or solids drier than ever before! Mix imagination and engineering with *Alcoa® Activated Alumina* in your drying operation; this "old reliable" among commercial desiccants has been thoroughly proved in service. Count on it to achieve the lowest dew points you require. Drying costs are remarkably low because Alcoa Activated Alumina can be saturated and reactivated indefinitely without effective loss of drying capacity. If *you* have a dehydration problem and you haven't tried Alcoa Activated Alumina, you should—at *once*. For full information and samples contact the local Alcoa Sales Office or write ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 707-A Alcoa Building, Pittsburgh 19, Pa.

ALCOA CHEMICALS
ALUMINUM COMPANY OF AMERICA

"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings

For finer products . . . let Alcoa add new directions to your creative thinking!

Now . . . the ultimate in raw material for polishes

CARDIS POLYMER 10

developed by Warwick Wax—originators, pioneers and leaders of the oxidized wax industry

CARDIS POLYMER 10 will give your polish film the **perfect balance** of the following characteristics—previously obtainable only through a complicated combination of different ingredients.

Lightest Color
Unexcelled Non-Scuff
Unexcelled Non-Scratch
Positive Anti-Slip
Greatest Hardness
Superior Toughness
Perfect Plasticity
Durable Shine
Highest Gloss
Superior Water-Resistance

Excellent Durability

CARDIS POLYMER 10 fits all types of polish formulations: dry bright (self-polishing waxes), resinous floor finishes, heavy duty institutional polishes, solvent type polishes (paste and liquid).

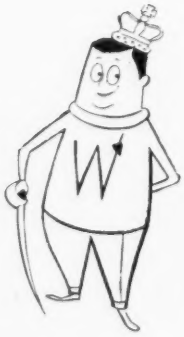
SPECIFICATIONS

Color	**1-1½ N.P.A. (Ivory)**
Penetration	**0-1**
Melting Point	**212-216°F**
Acid No.	**8-10**
Saponification No.	**25-30**

Simplify Your Formulations, Production and Inventory Problems with

CARDIS POLYMER 10

With CARDIS POLYMER 10 you receive exclusive technical service, market research and advertising counsel. This is all available to you without charge or obligation from Warwick's 33 stock and service centers in the United States and Canada. Write, wire or call for information and samples.



Warwick Wax Co., Inc.
A SUBSIDIARY OF
SUN CHEMICAL CORPORATION
10th Street & 44th Avenue, Long Island City 1, N. Y. • STillwell 6-1100
Midwest Office: 6556 S. Melvina Avenue, Chicago 38, Ill. • LUdlow 5-5700

PROTECTIVE'S

DRUM LINERS ★ BAGS ★ CARTON LINERS

. . . all styles, all sizes,
produced with fine materials:
Polyethylene, Vinyl, Laminates
and other flexible films —
all at surprisingly LOW PRICES!

DRUM LINERS

BAGS

CARTON LINERS

*Double-Seal Guaranteed Safety...

SUCCESS!

*"TWIN-SURE" DOUBLE-SEAL®
straight bottom liners

"POWER-SEAL"
round bottom liners

. . . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

. . . here are just a few users of protective liners:

Allied Chemical & Dye Corp.
The Borden Company
Brookhaven National Laboratories
C-O-TWO Fire Equipment Company
E. I. duPont de Nemours & Co.
Endicott Johnson Corp.
General Electric Company
McKesson & Robbins, Inc.
National Lead Company
Chas. Pfizer & Co., Inc.
Swift & Company
Union Carbide & Carbon Corp.
U. S. Quartermaster Corps

Guaranteed Satisfaction
Free Consultation
Free Samples

Write Dept. CW-18

PROTECTIVE LINING CORPORATION

GENERAL OFFICES AND PLANT: 2[illegible] WOODHULL STREET, BROOKLYN 31, NEW YORK

® TRADEMARK

To make a good shampoo...

You need CARBIDE'S Ethanolamines

Good detergent action, mild alkalinity, and bland skin action—are three reasons why soaps based on mono-, di- or triethanolamine are used to make fast selling hair shampoos. For example, a good shampoo is made from a coconut oil soap of triethanolamine which combines excellent detergent, lathering, and rinsing properties. Suggested formulations for shampoo concentrates made with triethanolamine or mono- and triethanolamine soaps are given in "Emulsions and Detergents". In fact, this 92 page booklet contains a section on all types of detergents.

"Emulsions and Detergents" also provides valuable technical information and suggested formulations for solvent emulsions, "soluble" oils, wax emulsions, and oil and wax polishes. You'll want this booklet for everyday reference. To receive a copy fill in this coupon and send in today.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

Union Carbide Chemicals Company, Room 328, 30 East 42nd Street, New York 17, N. Y.

SEND ME A COPY OF THE 92 PAGE BOOKLET—"Emulsions and Detergents"

Name .....

Company .....

Address .....

City ..... State .....

"Union Carbide" is a registered trade-mark of Union Carbide Corporation.

UNION CARBIDE

CHEMICALS

Union Carbide Chemicals Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

OPINION

President Speaks

TO THE EDITOR: I just received my Dec. 14 copy of CHEMICAL WEEK and feel the urge to comment to you on the article about Catalin. It is, in my estimation, one of the finest pieces of reporting that has ever come to my attention. I particularly wish to commend you on your simple and direct way of presenting facts. With a few words and pictures, you have described our situation accurately and effectively. I wish to compliment you and your organization.

H. KREHBIEL
President
Catalin Corp. of America
New York

Another Slant on Manpower

TO THE EDITOR: As chairman of the recent American Nuclear Society's symposium on education, I had occasion to make a thorough study of the Atomic Industrial Forum's manpower and industry surveys. Your readers may be interested in comparing what I would have written with what your staff wrote about the survey.

My headline: Current Numerical Overload of Scientists and Engineers in Nuclear Industry to Continue to 1960.

CW headline: "Atomics Raid CPI Manpower."

My key points: Two-thirds of the 280 privately owned companies in the atomic energy fields report no shortages of scientists and engineers. Spot shortages reported by the maverick companies amount to only 5.2% of the total numbers employed. Considering the number of engineers affected by AEC cutbacks (Columbia's Mineral Beneficiation Laboratory, for instance), or suspended reactor construction (Foster Wheeler, AMF), it will be up to the chemical process industries to provide jobs for these people.

Employment is estimated to increase by 78% in the next three years. However, if one considers the fact that about 50% of the industry's employees are now on a half-time basis, only 2,500 new jobs will be available in the next three years. (We shall be graduating 75,000 scientists and engineers during that same period.)

CW key points: "Firms in the process industries face heightened competition for atomic engineers and scientists in the next three years."

"Process companies (both in and out of the nuclear industry) will find increasing competition for new graduates in process industry fields."

I do not mean to imply that your article is not factual, or even that it is distorted. The whole question is one of headlines and emphasis.

It is high time the adjectives "critical" and "shortage" stopped preceding engineering manpower. A magazine such as yours could make a great contribution to the profession if it would agitate for higher salaries and higher performances. The latter must precede the former; hence, our first step should be in the direction of higher entrance requirements and stiffer and longer curricula in the nation's schools.

ERNEST J. HENLEY
Assistant Professor
Columbia University
Dept. of Chemical Engineering
New York

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

Petrobras' Shale Oil

TO THE EDITOR: We note that a recent article about Petrobras oil shale development in Brazil contains some errors. The article in question (*Nov. 23, p. 62*) states that Petrobras will build a prototype plant to make oil from shale. The decision to build the prototype plant has not yet been made. Meanwhile, it is only correct to say that Petrobras is considering whether or not to build a prototype plant.

The article further states that Petrobras is also considering a 1,000-tons/day plant if the prototype proves successful. The truth is that the prototype plant itself is being planned for about 1,000-tons/day capacity, and a commercial plant of about 50,000 tons/day will probably be built if the prototype proves that the economics are attractive.

We call your attention to the wrong spelling of our company name as engineering consultant to Petrobras in the above mentioned article.

K. L. BERRY
Project Engineer
Cameron and Jones, Inc.
Denver, Colo.

Beckman Bargain

TO THE EDITOR: At $1 per share (*CW, Dec. 7, p. 35*), Beckman Instruments is the best buy on the NYSE.

S. C. SCHUMAN
Hydrocarbon Research, Inc.
Trenton, N.J.

Indeed it would be, were it true. We should have said par value rather than market value.—ED.

MEETINGS

Texas A&M College, symposium on "Instrumentation for the Process Industries," College Station, Tex., Jan. 22-24.

Soap Industry Convention, Waldorf Astoria, New York, Jan. 22-24.

Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Jan. 27-30.

Society of Plastics Engineers, meeting on Progress through Plastics Engineering, Sheraton-Cadillac Hotel, Detroit, Jan. 28-31.

International Management Division of American Management Assn., conference on effect of European common market on overseas operations, Biltmore Hotel, New York, Feb. 3-5.

Reinforced Plastics Division of Society of Plastics Industry, 13th annual technical and management conference, Edgewater Beach Hotel, Chicago, Feb. 4-6.

Chemical Market Research Assn., joint meeting with **National Assn. of Purchasing Agents;** subject: economic projections; Sheraton-Park Hotel, Washington, Feb. 6.

Quality in any Quantity...Quick!

ESSO HEXANE

Because service, like quality, is traditional, you can rely on immediate availability and fast delivery of Esso Hexane. Made from carefully selected crude oil sources, Hexane offers top purity and uniformity for more efficient, economical application to your specific use. Be sure to specify Esso Hexane for finer quality . . . faster!

Available from storage in Bayonne • Baytown • Memphis • Providence

Perfected by research ESSO *Proved in performance*

PETROLEUM SOLVENTS

Business
Newsletter

CHEMICAL WEEK
January 18, 1958

Chemical process companies this week are gearing their operations to the needs of the rocket era: Phillips Petroleum and North American Aviation are forming a joint-interest company to be known as Astrodyne, Inc. This new firm—to be located at Air Force Plant 66 near McGregor, Tex.—will "expedite research, development and manufacture of higher-energy solid fuels, propellents and devices for use in rockets and missile systems." A comparable situation: the Olin Mathieson-Marquardt Aircraft-Reaction Motors working arrangement in the same general field (*see also pp. 22-23*).

•

But two older process industry trends—toward ever-greater production capacity for paper and plastics—are still going strong.

• Witco Chemical Co. (New York) plans to build a 20-million lbs./year phthalic anhydride plant in Chicago, with completion scheduled for early '59.

• And another Southern lumbering company is entering the pulp and paper industry. Dierks Forests, Inc., is starting up its new $12-million integrated mill near the Dierks lumber mills north of Pine Bluff, Ark.

•

Prospects for mining metal ores in the Carolinas seem to have suffered a partial setback this week. After three years of prospecting for bauxite along the North Carolina-South Carolina border country (*CW, Feb. 2, p. 24*) in the vicinity of Rutherfordton, N. C., and Spartanburg, S. C., Piedmont Properties, Inc. is going to quit the area. Maurice Bennett, manager of Piedmont—an affiliate of Aluminum Co. of America—says it will close its laboratory at Spartanburg as soon as the existing ores have been processed. He adds that Alcoa has no plans for prospecting in the surrounding counties.

And North Carolina's Council of State has sent back to the state's Board of Conservation and Development a proposed lease covering phosphate exploration and mining rights on some 60,000 acres of state-owned underwater lands in Hyde and Beaufort counties. Applicant for that lease: Bear Creek Mining Co., a wholly owned subsidiary of Kennecott Copper Co. Final state approval was withheld following Governor Luther Hodges' receipt of a letter from Bryan Rock and Sand Co., which objected that granting the lease would amount to giving Bear Creek a monopoly.

•

Indications are that labor unions will be more militant in '58, in contrast to relatively few strikes last year. Already, a spat between AFL-CIO Millwrights and the Baton Rouge chapter of associated General Contractors of America has temporarily halted construction work on seven major process industry expansion projects along the Mississippi River near that city.

And President Walter Mitchell of the International Chemical Workers Union is suggesting that ICWU's councils undertake company-wide automation studies. The goal: to get employers to "sit down and exchange views" on automation's effects and related problems.

•

Tariffs are in the news again this week. Britain is pinning an added 56¢ antidumping duty on imports of silicone fluids from France to protect its domestic producers, Imperial Chemical Industries and Albright & Wilson Ltd. Biggest silicone importer has been the French firm of Rhone-Poulenc.

•

First supplies of shale oil are seeping onto the market. Industrial use is still small, but Union Chemical Co. reports it has sold 12,000 bbls. to mining companies in western Colorado—the first time shale oil has been used in industry, according to Union Chemical officials. The company says shale oil prices are still "open to negotiation" since there's not as yet an established market for the product.

•

First chemical company owned jointly by 12 different countries is being formed at Mol, Belgium. Called Eurochemic, the new firm will irradiate 100 tons/year of uranium for production of plutonium fuels at a new $10.2-million plant. The firm is owned by the European Organization for Economic Cooperation, which has 12 member nations. Startup is scheduled for early '61.

•

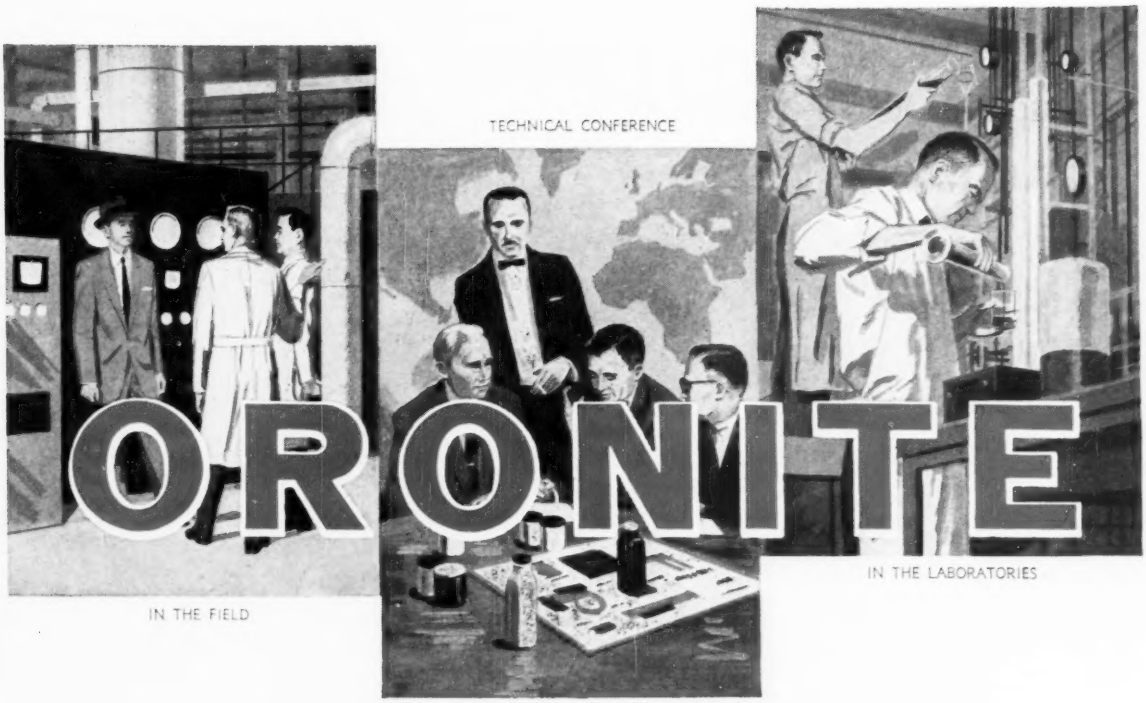
Industry has a new liaison man in the Business & Defense Services Administration. He is Robert Prather, formerly of Merck & Co., new appointee to the post of industry advisor to BDSA's Chemical & Rubber Division. Under the reorganized setup, he will serve as advisor, not as director. The new director is Bernard Kilgore, career employee, who has had 25 years of industry experience as a research chemist with Du Pont and USI.

•

A chinaware manufacturer's purchase of a plastic dinnerware maker has all the earmarks of a marriage between members of the feuding Hatfield and McCoy clans (*CW, June 19, '54, p. 42*).

But that's what happened last week when Lenox, Inc. (Trenton, N.J.), paid more than $2 million to acquire Branchell Co. (St. Louis, Mo.). With combined sales volume of $14 million/year, Lenox is expected to be the nation's biggest producer in the over-all dinnerware field.

Lenox—a maker of quality chinaware since 1889—says the move was part of a long-range diversification policy. Also, Executive Vice-President J. M. Tassie says Lenox preferred to enter the plasticware field rather than market a lower-priced chinaware line. He says the $70-million a year plastic dinnerware business "shows ample evidence of further growth potential."



where technical service is a proven FACT!

What should a supplier offer in the way of technical help?

With Oronite this *is not* a loosely used term to describe technical assistance which is implied but can't be delivered. Technical Service from Oronite is a defined course of action embodying a group effort of scores of technically trained people specializing in product applications to specific industries.

Field representatives are familiar with Oronite products and their applications; product specialists continually supply technical data to the field men; in the laboratories, sections of research chemists and engineers devote full-time exploring and documenting new factual data on Oronite products and their uses.

Most important is the Oronite philosophy of translating research and technical service to your individual needs. Oronite recognizes that each raw material application is different but that helpful supplementary assistance can be provided on an individual basis.

When a company becomes an Oronite customer, *technical service* continues — providing the customer new data as it develops, suggesting ways of cutting costs, cooperating in every way possible to make your association with Oronite more valuable.

Yes, Technical Service at Oronite is a FACT. Why not call on Oronite and see for yourself the depth of our technical assistance on your problems.

ORONITE CHEMICAL COMPANY
A SUBSIDIARY OF CALIFORNIA CHEMICAL COMPANY
EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Tulsa, Los Angeles, San Francisco, Seattle
EUROPEAN OFFICE • 36, Avenue William-Favre, Geneva, Switzerland

4646

Improving products,
smoothing processes,
cutting costs,

ULTRA DETERGENTS SYMBOLIZE...

WITCO

Millions of bubbles make an appealing picture and insure adequate coverage for modesty. Sulframin® AB 40 beads' highly effective foam exhibition and wetting properties are particularly valuable in the manufacture of cosmetic products.

Other products manufactured by Witco and its divisions are:

Stearates
Stabilizers
Driers
Plasticizers
Rubber Chemicals
Gelling Agents
Extender Pigments

Specially prepared Bituminous Compounds and Mastics

Synthetic Detergents
Detergent Additives
Spray-dried Chemicals
Organic Chemicals

Channel and Furnace Blacks

Emulsifiers and Surface Active Agents for agriculture, foods, cosmetics, and other industries

WITCO®

WITCO CHEMICAL

122 East 42nd Street, New York 17, N. Y.

14 Manufacturing Plants—7 Research and Technical Service Laboratories, Sales Offices in Principal Cities

chemicals at work

In detergents and wetting agents, Witco's Ultra Division has developed outstandingly efficient compounds which improve products and processes yet lower manfacturing costs. Their value is proved in many fields, from cosmetics to leather processing, textiles to dishwashing.

Detergents are only one product line of one Witco division. The company manufactures a wide range of other industrial chemicals in bulk quantities. Stearates, rubber chemicals, emulsifiers, asphaltic compounds, carbon blacks...whatever the product, the name *Witco* guarantees high quality.

Witco has specialized technical service laboratories, too...on call at all times to help customers solve any processing or raw materials problems. On your behalf, they will investigate new manufacturing techniques or evaluate old ones.

When you buy Witco, you buy highest grade chemicals *plus* unsurpassed service. At some point in your processes or products, Witco chemicals can be of benefit to you. Write today for details on how Witco can help solve your manufacturing problems.

Ultra Sulframin® E Liquid finds wide use in car and bus laundries. Readily soluble even in cold water, it combines maximum detergency with complete and easy rinsability.

Uniform textile dyeing becomes a simple operation when fibers are processed with Ultra's outstanding fulling and scouring agents and dyeing assistants.

COMPANY

ULTRA Chemical WORKS · CONTINENTAL BASES · Emulsol · Witco CHEMICAL COMPANY

WITCO CHEMICAL COMPANY, Dept. CW1
122 East 42nd Street, New York 17, N.Y.

Send me information on Ultra's detergents and other products for:

_____

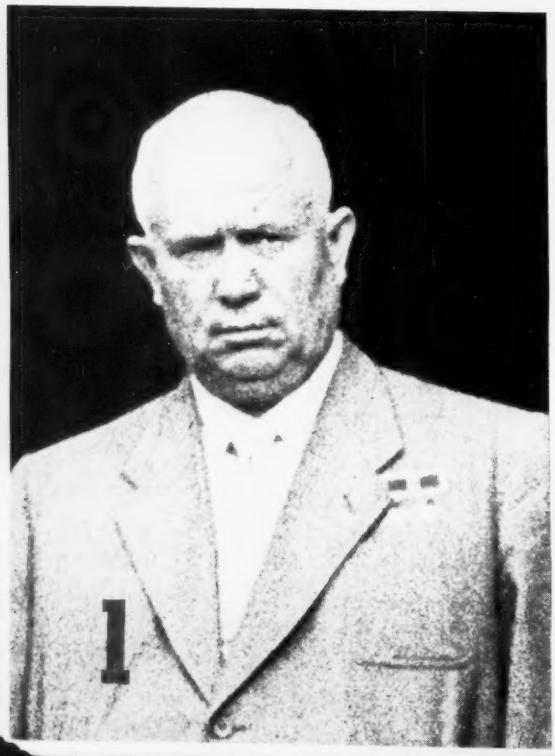
_____

Name _____

Company _____

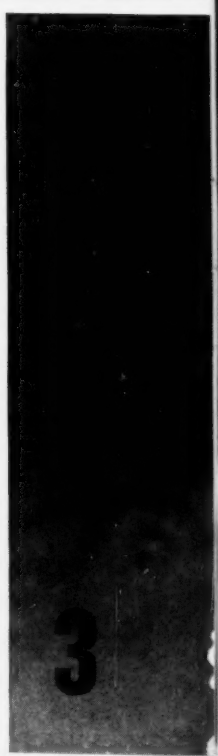
Address _____

City _____ Zone _____ State _____

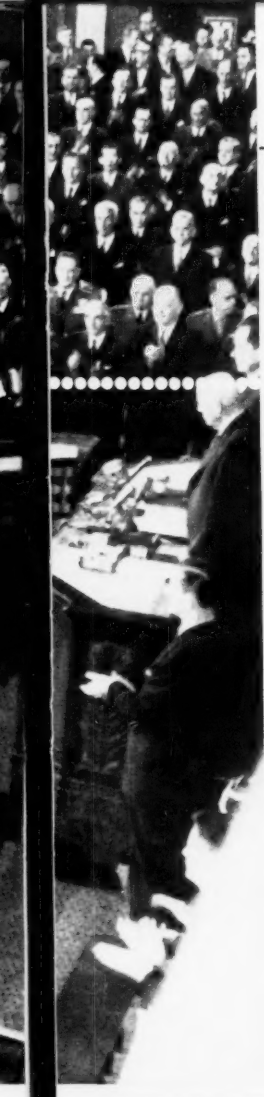


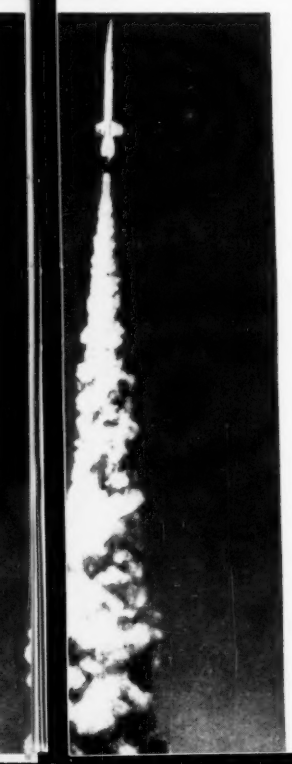
1

EMPLOYMENT
TRANSFERS & TERMINATIONS
UNEMPLOYMENT COMPEN
AND
S.U.B.P. OFFICI



3





Reds, Recession, Rockets

State of Union message—on Red threat, layoffs, rocket problems—portends crucial decisions for the technology-based CPI.

NEW FEDERAL PROGRAMS and policies heralded or hinted in President Eisenhower's State of the Union message late last week will be major factors in chemical process companies' business decisions over the coming year.

For process industry management, interest centers on three principal subjects that Eisenhower dealt with at length in his 44-minute address to both houses of Congress:

- Foreign trade and foreign aid. It's to be stressed as essential to U.S. security, as a means of countering pro-Soviet and neutralist gains in friendly and uncommitted nations.
- Business outlook. Eisenhower is confident "that economic growth will be resumed without an extended interruption."
- Missiles in particular and science and technology in general. Eisenhower pledges that the U.S. will take whatever steps are necessary to catch up with the Soviets in rocket power. He has committed himself to an outlay of at least $1 billion over the next four years for aid to schools. Emphasis will be put on science education and basic research.

Struggle for Leadership: For the first time, Eisenhower publicly faced up to the fact that the U.S. is probably behind the U.S.S.R. in military missiles. In pledging that the U.S. will catch up, the President faces one of the most severe leadership tests since he came to power five years ago. Both House and Senate are under Democratic control. Beyond that, the two majority chiefs on Capitol Hill—Senate leader Lyndon Johnson and House Speaker Sam Rayburn—are clearly skeptical that Eisenhower is ready to do enough to overtake the Soviets in the shortest possible time.

White House discipline of Congressional Republicans may be fairly effective on the missile issue. But the Presidential line of thinking—with emphasis on getting production and improvement of intercontinental and intermediate ballistic missiles—is pretty pale, compared with the Johnson-Democratic line. Publicized two days ahead of the Eisenhower speech, it looks toward dominance, not merely missile parity with Russia.

This appears to be a fair summary of the missile question at this point: Senator Johnson looks and sounds like a man who has found the big issue for a run at the Presidency in 1960. But clearly not all of Eisenhower's troubles are going to be with Johnson or Rayburn. The President probably must first deal with the Pentagon upheaval. This will be diverting and costly. The measure of enthusiastic military support given the Administration's defense budget during coming months will tell how well Eisenhower and his new Defense Secretary, Neil McElroy, can rein in the generals. Some vigorous men have worn themselves down on that mission.

Stern on Trade and Aid: Eisenhower, as expected, put in strong plugs for continuation of mutual aid programs to bolster friendly and uncommitted nations of the world, both economically and militarily. In future economic assistance, the President said, he will recommend greater use of repayable loans and less outright grants.

The President also demanded from Congress a five-year extension of the Trade Agreements Act with broader authority to negotiate more pacts on implicitly easier terms.

Here again, the task of Presidential leadership is going to be big. The aid program is under fire from influential persons in both parties, but the Democratic leadership is committed to helping Eisenhower—if he

will personally make a fight for his program.

Scientific Exchanges Asked: The Administration's science and education plan calls for annual expenditures for improvement of teaching quality (especially science teaching), federal scholarships, and stimulation of basic research.

In a related area, the President also gave an "imperative" tag to legislation that would enable the U.S. to exchange "appropriate scientific and technical information"—atomic, presumably—with friendly nations.

Thus was the stage set for the year's debate on a new national course. With the State of the Union message behind him, Eisenhower took the next step this week when he sent his record-breaking fiscal 1959 budget to Congress (table, below; and story, right). Attention was riveted immediately on the controversy-ridden security expenditure proposals—for missiles, warplanes, scientific research, education.

New Budget: Spotlight on Science:

(In millions of dollars)

Agency or Function	Fiscal Year 1957-58	Fiscal Year 1958-59
FOR SCIENTIFIC RESEARCH AND DEVELOPMENT		
Agricultural Research & Services		
Production Research	104.7	120.2
Marketing Research	29.7	35.2
State Experiment Stations Support	30.4	30.4
Industrial Utilization Research	14.0	19.0
Atomic Energy Commission	538.0	545.8
Bureau of Mines		
Resources Technology	16.8	18.5
Department of Defense	1,800.0	2,000.0
National Bureau of Standards	9.2	11.2
National Science Foundation	20.6	45.7
Public Health Service		
National Institutes of Health	210.9	211.2
Air Pollution Research	4.0	3.86
Water Supply & Pollution Programs	6.5	6.6
Saline Water Research	.671	.8
Tennessee Valley Authority		
Fertilizers & Munitions	19.2	20.7
Veterans Administration		
Medical Research (Drug Evaluation)	8.7	9.3
FOR POLICING BUSINESS AND INDUSTRY		
Federal Trade Commission		
Antideceptive Practices	1.23	1.28
Antimonopoly Activities	2.28	3.31
Dept. of Justice, Antitrust Division	3.773	3.8
Securities & Exchange Commission		
Prevention & Suppression of Fraud	2.5	2.8
Food & Drug Administration	9.3	9.3
Post Office		
Enforcement of Postal Fraud Statutes	1.8	1.9
FOR DIRECT SERVICES TO INDUSTRY		
Dept. of Commerce		
Business & Defense Services Admin.	5.7	7.5
Census Bureau	7.8	8.8
Patent Office	18.4	18.9
General Services Administration	565.0	422.0
FOR AID TO EDUCATION (Direct Aid to Schools, Colleges, Scholars)		
Dept. of Health, Education & Welfare	None	75.0
National Science Foundation	15.7	51.9

1 REDS—

and what our government's 'Khruschev budget' will mean to process industries

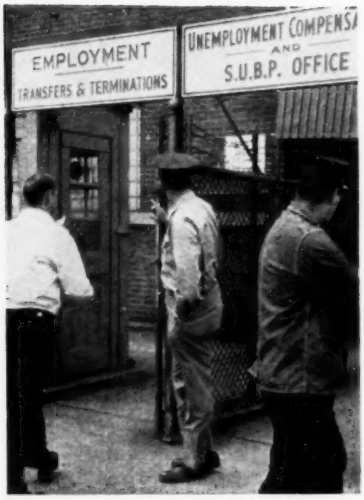
Reflecting the nation's rising reliance on science and technology as keys to the U.S. security, the proposed 1958-59 federal budget calls for increased spending on research and development (*table, left*).

Basic research in chemistry, biology, physics, geology and mathematics is to be backed with federal dollars as never before.

Military and defense-related atomic programs will continue to account for the lion's share of federal research outlays. President Eisenhower is seeking $2.3 billion—out of a total budget request of $73.9 billion—for the armed services' research and development work. However, actual spending under this category is estimated at a flat $2 billion, compared with the $1.8 billion being spent this year.

The National Science Foundation is asking for $58 million to finance work of thousands of scientists—in universities and elsewhere—in pursuit of new knowledge. That amount would permit a sharp step-up in studies in high-polymer chemistry and other still-infant fields.

Other budget proposals: fresh emphasis on finding new industrial uses for farm crops, more attention to biological effects of radiation, and increased allotments for government services to business.



2 RECESSION—

and how it's affecting chemical process companies' employment and earnings

Prospects for an economic upturn by this summer shine especially bright this week for the chemical process industries. Summer could well mark the end of the downward trend that has been nibbling at sales, production and employment in many industries.

Four months ago, the sprinkling of layoffs and production cutbacks was heavier in the process industries than in the economy as a whole.

But now—according to a *CW* survey of employment/unemployment conditions in many parts of the nation—the shoe is on the other foot. In many cases, process industry employment has been relatively stable or even inching upward this month, while various durable goods plants have been hard hit by temporary layoffs.

Rise in Capital Spending: One clear note of optimism: the latest government survey of capital investment programs, pointing to a planned 7.7% increase in process companies' expansion spending in this quarter, as compared with the first three months of 1957. Plant and equipment expenditures in the process industries for the first-quarter periods of each year: 1956, $1,306 million; '57, $1,601 million; and '58 (planned), $1,724 million.

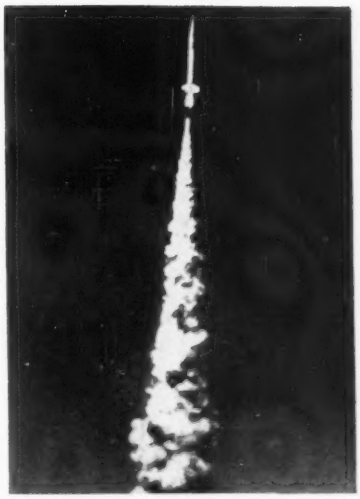
Other grounds for optimism about early recovery for the process industries: the virtually certain prospect of increased buying by the federal government, as outlined in the President's State of the Union message and his budget proposals (*pp. 23-24*); falling inventories in some industries —e.g., textile mills—that are major markets for the CPI's products.

Letting of defense contracts during the first half of this calendar year is likely to be double the $5-billion total for the last half of '57, and process companies are sure to share directly and indirectly in this business. In some areas of industry, according to McGraw-Hill's Dept. of Economics, inventory liquidation is probably being overdone now; this could be the case with steel, copper and other metals, various semifinished metal products and components, and textiles and apparel. Decisions to rebuild stocks could bring a flurry of orders to suppliers.

Few Sweeping Cutbacks: Special circumstances seem to apply to each of the few cases of major cutbacks in the chemical process industries this month. In aluminum, for example, there were two reasons for closing two of the eight potlines at Kaiser Aluminum & Chemical's reduction plant at Mead, Wash. One was the electric power shortage resulting from unusually low flow in the Columbia River and its tributaries; the other was the frugality-inspired "stretch-out" in the Air Force's plane procurement program. Neither factor is indicative of slackening nonmilitary business.

The plane procurement stretch-out also was a factor in the December-through-February layoff of about 800 of the 7,000 employees in Dow Chemical's Texas Division. But another reason was that during the past few years—while it was nip-and-tuck whether the government would allow Dow to buy the government-owned, Dow-operated magesium plant near Freeport—the company was building up an inventory of the metal. When Dow's bid was finally accepted, the company found it had too much magnesium on hand for the temporarily smaller market.

But the same company's Midland (Mich.) Division reports that employment increased during 1957 and is now holding up well while expansion is going ahead at a near-record pace. This, more than the relatively isolated layoffs, appears to be typical of the CPI's current situation.



3 ROCKETS—

and how process industry companies can contribute to national security

Aroused by the post-Sputnik barrage of official, political and scientific calls to action, the chemical process industries stand ready to assume a bigger role in a stepped-up defense effort. What form this increased effort will take is still not clear.

Here is the picture that emerges from interviews with industry, government and education leaders.

At the Pentagon, a notable calm prevails. In the office of the Secretary of Defense, the outlook for stepping-up the defense program is described as "good." But, according to a top aide, no dramatic moves for industrial mobilization seem in order. In the supply and logistics offices, the same story emerges. On carrying through present high-energy fuel projects the word is: the faster the better. On chemicals-for-defense, in general: no broad changes in present production and expansion plans are envisioned.

In the Office of Defense Mobilization and the Business and Defense Services Administration: no stirrings of urgency, "no change in outlook." "Skeleton machinery" for industrial mobilization exists, and is sufficient.

'Monstrous Mess': But from executives of chemical process companies involved in defense production, a different picture emerges. "There is now no central thrust or coordina-

tion," complains a top official of a firm working on high-energy fuels. "To accomplish planning or secure appropriations, we have to talk to a welter of services, commands, bureaus and offices. We have had several significant research developments pending for months. They were apparently okayed, but are bogged down awaiting appropriations."

According to this spokesman, the present missiles program does not suffer from a lack of scientists. But it is suffering from a lack of organization in the mobilization of companies and manpower. "It's a monstrous mess," says this observer.

A research director of a major chemical firm engaged in defense contract work feels that while more coordination is needed, the lack of communication is, in part, industry's fault —it hasn't made full use of the government's liaison machinery.

But moves to strengthen coordination of defense and scientific efforts are afoot. On Feb. 3, the President's Committee on Scientists and Engineers will bring together representatives of industry, education, labor, government and religion for a mobilization conference. Probably within a short time thereafter, a still-unannounced conference on the relationship of industry to basic research will be held by the government.

And the reshuffling of service responsibilities suggested in the State of the Union message may mean smoother government-industry contacts.

Plan for Action: But even though some industry efforts to give immediate aid to U.S. defense technology may be slowed by a lack of clear channels, most feel that process companies can make great contributions to the country's long-term scientific advance.

Spokesmen for the government's scientific and educational agencies, educational institutions, and companies already active in the field generally agree on these areas in which process concerns can help: improving scientific education and cultivating an environment in which science can flourish; promoting more basic research in and out of industrial laboratories; reviewing scientific and technical personnel policies as they affect hiring, utilization, and professional development.

Union Airs Royalty Plan

An employee-benefit device for oil and chemical industries is being studied this week by Oil, Chemical & Atomic Workers (AFL-CIO). It would be fashioned along the lines of a plan John L. Lewis put into effect in the coal industry.

Since 1946, coal mine operators have been paying 5¢/ton "royalty" into United Mine Workers' welfare and retirement fund. Now, OCAW President Jack Knight notes that there is increasing employer resistance to raising basic wage rates to the $5/hour average wanted by OCAW. He is suggesting creation of a somewhat similar fund for his members.

There would be at least one basic difference: while the UMW fund is for welfare and pensions, the fund envisioned by Knight would be run as a union-management-administered "savings and emergency fund, with each employee credited for his *pro rata* share." Employers' assessments would be in proportion to actual production, "with costs reduced when business is down." Calling the idea an opportunity to share the benefits of automation, Knight holds that employers should favor the scheme.

Broader Line in Nylon-6

Foster Grant Co. (Leominster, Mass.) is enhancing its position as both maker and fabricator of plastics. It's obtaining a license—from West Germany's leading nylon producer, Farbenfabriken Bayer—to manufacture a number of novel nylon-6 resins.

Foster Grant's nylon plant (Manchester, N.H.) is now expected to go onstream about the middle of March, producing one resin for molding, another for extrusion applications (*CW, April 6, '57, p. 23*). Starting material: caprolactam monomer from Allied Chemical's National Aniline Division plant at Hopewell, Va.

WIDE WORLD

Little Valley, Utah, Takes a Big Blast

Atlas Powder Co. last week carted 2.2 million lbs. of explosives to Little Valley, Utah, and set off the world's biggest nonatomic explosion. The blast converted a 300-ft. cliff into 3.6 million cu. yds. of rubble to be used as ballast in construction of a Southern Pacific Railroad causeway across Great Salt Lake. Explosives consisted of 60% dynamite and 40% ammonium nitrate blasting agent. Atlas employee Ralph Conner supervised and detonated the explosion, recorded hundreds of miles away.

WIDE WORLD

President-Director Loudon: Seeks expansion capital for oil-chemical giant.

New Light on 'Shell'

Chemical interests of the Royal Dutch/Shell companies make up one of the world's largest chemical organizations, with annual gross sales on the order of $400 million.

Previously undisclosed figures on Royal Dutch/Shell's far-flung chemical operations are among corporate data contained in the preliminary prospectus for this week's 7,602,285-share offering to stockholders of Royal Dutch Petroleum Co. (*CW Business Newsletter, Jan. 11*).

Included are two firm figures on the organization's chemical sales:

- Proceeds from sales of chemical products during the first nine months of '57—after deduction of sales taxes, excise duties and similar levies—amounted to $263 million.
- In physical volume, the nine-month chemical sales amounted to 1,573,500 short tons.

Chemical sales appear to account for about 6% of total "sales proceeds and other income" (not including dividend income) for the entire Royal Dutch/Shell group. Annual tonnage of chemical sales rose from 780,833 in 1952 to 1,985,800 in '56.

The Royal Dutch parent company headed by President-Director J. H. Loudon has a 60% interest in the group companies; the British-based Shell Transport holds 40%. Over the past six years, the companies have spent $1.2 billion on property, plant and equipment for oil refineries and chemical plants.

- **Build reactor around fuel elements?**

or

- **Design fuel elements to suit reactor?**

These are the horns of . . .

Atom Industry's Dilemma

Chemical companies interested in nuclear business are currently finding themselves involved in a budding controversy over how best to research and develop atomic power reactors.

One group, which includes most CPI firms with nuclear interests, proposes that the lion's share of research and development be directed at designing inexpensive, usable fuel elements rather than concentrating completely on reactor design. Then, they say, reactors could be built around the completed elements.

The other camp, predominantly engineering and contracting firms, holds that reactors—more expensive than fuel elements—should be built first. The fuel element, say proponents of this group, should be designed later to fit the reactor.

Element Research Gaining: All agree each side has merit and that development of one can never far outstrip the other. And, the feeling gained from interviews with men championing both causes is that neither group has a clear-cut edge over the other—though the fuel-element-first people may be gaining.

The latter group's reasoning goes like this: The fuel element is the "heart" of an atomic reactor. Operational success depends on its performance. The element must have optimum heat transfer to keep costs down, and must be shaped, formulated and jacketed for that purpose. There must be consideration, too, of whether oxide or metallic fuels should be used. Moreover, there is much investigation to be done to find less-expensive materials that could greatly cut down the cost of a reactor.

Then, there's reprocessing. Only a small fraction of the fuel is used up during fission, and the same element can be processed many times. The ease of reprocessing can account for a lot of savings in "operational costs." Fuel-element-firsters argue that this is another big reason for making reactor design second most important on the agenda.

Steps Toward Standardization: Fuel element makers and chemical companies interested in reprocessing say that developing a fuel element first—and perhaps finding elements that would work in more than one kind of reactor—would be taking a step toward standardization, something that companies in this field have long been awaiting. Moreover, the process of developing an element for an already-made, new species of reactor can be hugely expensive.

But the reactor group maintains that reactors, with all their plumbing and intricate chambers made of costly metals, are far more expensive than fuel elements will ever be. Since many different reactor designs are already off the drawing board and under construction, it would be wasteful to abandon them.

They further argue that it takes longer to design and build a reactor than it does a fuel element. Hence, researchers would have plenty of time to get going on a fuel element, redesign it and come up with what's wanted long before the reactor is completed.

But no one is predicting which group will eventually win out. Some postulate that both views will have supporters for a long time. AEC, which holds the purse strings for such projects, is supporting both types of research, though with a growing emphasis on development of fuel elements. Whatever the outcome, chemical companies with an interest in making or reprocessing fuel element will have a big stake in the decision.

COMPANIES

Harvey Aluminum is the new corporate name of Harvey Machine Co. (Torrance, Calif.). Executive vice-president of the 44-year-old concern, Lawrence Harvey, says the change, made last week, stems from the company's growth and expansion in the aluminum industry. The company became a primary aluminum producer last year. It also produces titanium and zirconium ingots as well as numerous mill and fabricated products of various metals.

•

Minnesota Mining & Mfg.'s secondary offering of 105,000 common shares at $75.50/share has been oversubscribed and the books closed. The offering was made last week through a group of underwriters headed by Goldman Sachs & Co., Kidder, Peabody & Co. and Piper, Jaffray & Hopwood.

•

Fulton Bag & Cotton Mills (Atlanta, Ga.) has sold its branch bag manufacturing plants in New Orleans and St. Louis to Fulton Bag & Products Co., a newly formed firm headquartered in New Orleans. Terms of the transaction were not revealed.

•

Isotope Products Inc.'s former Instrument Division, which recently merged with Curtiss-Wright Ltd.—the Canadian subsidiary of Curtiss-Wright Corp.—will close its plant in Buffalo, N.Y., and move all equipment to Curtiss-Wright's Electronics Division plant at Carlstadt, N.J. Thomas Pepper, former president of the Instrument Division, said the move will be completed this month.

EXPANSION

Gas Treatment: Transcontinental Gas Pipe Line Corp. is building a $2-million unit in McCullen County, Texas, to remove water and acid from gas before it's piped to consumers. Contractor is Fluor Corp. (Los Angeles).

•

Hydrofluoric Acid: Stauffer Chemical Co. will add a large hydrofluoric acid plant to its petrochemical complex in Louisville, Ky. Engineering studies are now under way, with contruction scheduled to start in the next few months. Tentative completion date: mid-'59.

•

Thorium: Dow Chemical of Canada, Ltd., and Rio Tinto Mining Co. of Canada Ltd. have formed a jointly owned company to produce thorium and rare earths from by-product materials of uranium mining (*CW, April 27, '57, p. 96*). Production at the Blind River area of Ontario will be carried out at a new plant to be built near the Canadian uranium deposits.

•

Paper: Bergstrom Paper Co. (Neenah, Wis.) will build a new plant three miles south of Neenah to house its Waupaca, Wis., division. The division, formerly known as the Whale Paper Co., will be moved because of insufficient water supplies in the Waupaca area. Construction on the new unit is expected to get under way this spring, with completion scheduled for late '58.

•

Alabama Metallurgical Corp. is completing plans to build a $7-million plant near Selma, Ala. The company has already purchased a 467-acre tract near the town and last week bought additional land to extend railroad facilities to the proposed plant site. The new unit will reportedly refine magnesium from ore mined near Montevallo.

•

Bentonite: Archer-Daniels-Midland Co. is building a new plant at Colony, Wyo., to supply bentonite to consumers in the Midwest. Bentonite, used chiefly as a bonding agent for pelletizing iron powder extracted from taconite rock, will be stored in two large silos with a combined capacity of 1,000 tons. Stockpiles of crude clay at the plant site total nearly 150,000 tons.

FOREIGN

Plastics/West Germany: Production of plastics in West Germany during the past year totaled 433,000 tons as of Sept. 30 and may have reached a 600,000-ton total by Dec. 31. That would be a 14% increase over '56 output.

•

Fertilizers/Egypt: Original capital of $23 million of the state-controlled Egyptian Chemical Industries Co. has been nearly all used up in construction of the Aswan fertilizer plant by German and French firms. The company is seeking to raise an additional $23 million through public subscription.

•

Polyethylene/Australia: Onstream now for less than a month, Australia's first polyethylene plant is already in line for expansion. Imperial Chemical Industries of Australia and New Zealand Ltd. says it will invest

•

Engineering/Japan: In Tokyo, Foster Wheeler Co. Ltd. and Ishikawajima Heavy Industries Co. Ltd. have formed an engineering consulting firm as a 50-50 joint venture.

•

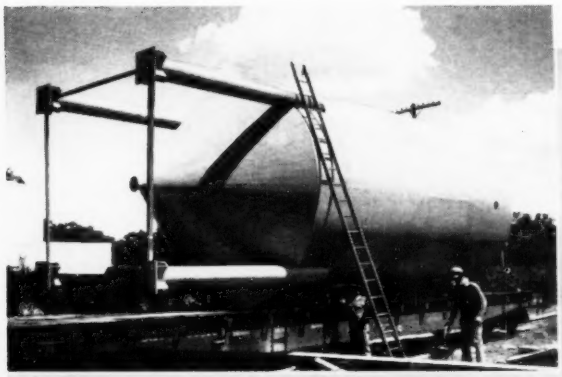
Equipment/China: Under a new directive from Red China's Communist Party Central Committee, a new governmental agency is being formed to undertake manufacture of virtually all machinery and equipment needed for the country's chemical fertilizer industry. An official dispatch relates that high-pressure air compressors and other equipment have been turned out on an experimental basis, "but the question remains as to the quality when the compressors are arranged for quantity production."

In Custom Fabrication of

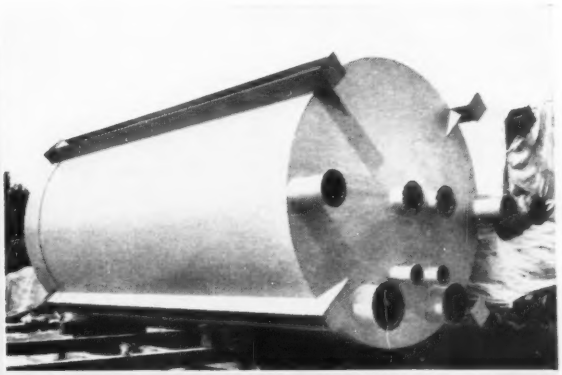
CODE TANKS and PRESSURE VESSELS

there is no substitute for *Experience*

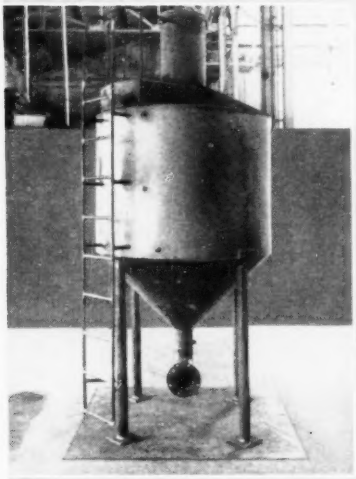
Modern Welding offers a wealth of experience in custom fabrication. Our well equipped strategically located plants serve chemical processing and petroleum industries throughout the world. Our facilities are at the disposal of the men who design, construct, operate and maintain processing plants.



Sludge Settler tank for petrochemical plant is the first in this revolutionary new design.



Dual purpose phenolic-lined polyethylene storage tank with structural reinforcements.



Calibration and prover tank for measuring the accuracy of pipeline crude oil meters.

Air receiver tanks for compressor stations. Pressure tested in 450 lbs. of hydrostatic pressure conforming to A.S.M.E. 1952-A code. Each X-ray tested.

MODERN TANKS QUALITY

MODERN WELDING COMPANY

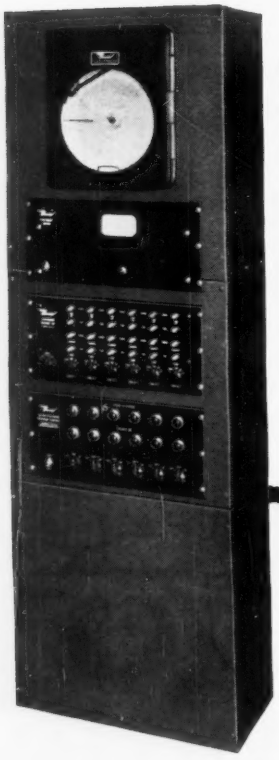
INCORPORATED

Owensboro, Kentucky

NEWARK, OHIO · ORLANDO, FLA. · HOUSTON, TEXAS · BURLINGTON, IOWA

★ Viscosity
★ Specific Gravity

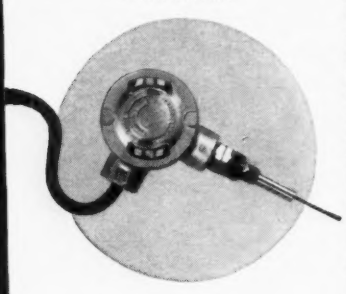
A BETTER WAY TO CONTROL EACH, AUTOMATICALLY AND CONTINUOUSLY

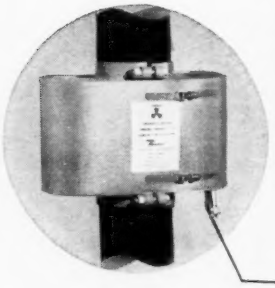


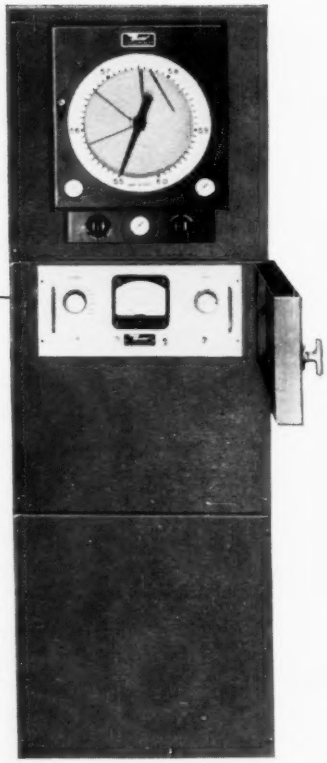
BENDIX ULTRA-VISCOSON*

Provides continuous and automatic viscosity control of from one to six individual stations in a single system. Ranges: 0-50,000 centipoises X grams /cc. Proven uses in liquid blending, fuel atomization or refinery applications in the petroleum, chemical, steel, gravure and flexographic printing, resin, adhesives, paint finishing and various other fields. Ultra-Viscoson systems are available to fill most industrial and research requirements.

*REG. U. S. PAT. OFF.







BENDIX NUCLEAR DENSITY GAGE

Provides continuous and automatic control of fluid density in process pipelines. Range: 0.5 Sp. Gr. and up, with adjustable spans. Ideal for use with abrasive, corrosive, viscous and high-pressure processes; sensing element does not contact process material. Applications: Density, specific gravity, liquid concentration, vapor/liquid ratio, liquid level, slurry control and interface detection. Range, span and time constant adjustments from front panel.

For complete information write
Cincinnati Division, Dept. 310, 3130 Wasson Road, Cincinnati 8, Ohio.

Cincinnati Division

Export Sales: Bendix International Div., 205 E. 42nd St., New York 17, N. Y. Canada: Computing Devices of Canada, Ltd., Box 508, Ottawa 4, Ontario

Bendix
AVIATION CORPORATION

Washington
Newsletter

CHEMICAL WEEK
January 18, 1958

Commerce Dept. counts on the chemical process industries to help offset the business slide this year. In an industry-by-industry rundown, the Business & Defense Services Administration finds the CPI among those that "are looking to normal growth."

Due to gain: cement, industrial chemicals, synthetic rubber, photographic products, containers, pulp, paper and hardboard. On the downside—but, says BDSA, "due naturally to be influenced by defense planning"—is aircraft. Other industries on the downside with no specific prospects for improvement now in sight are copper mining, industrial furnaces and ovens, machine tools and railroad equipment.

- Industrial chemicals—by-products of coal tar and petroleum—should show output of about 5% over '57. Inventory reduction is anticipated.
- Portland cement outlook is for shipments to exceed '57's 300 million bbls.
- Plastics production should increase 5% over last year.
- Synthetic rubber production is expected to be up 10%.
- Photographic materials, including film, should be up 5%.
- Synthetic fibers show a mixed trend: "There is little indication of satisfactory markets for rayon and acetate fibers . . . though newer synthetics are expected to continue to prosper and expand."
- Pulp, paper and board production should hit a new all-time high, 3-5% over last year.

Administration policy on fighting the skid will come Monday of next week. It will be spelled out in detail in Eisenhower's annual economic report to Congress, prepared by the Council of Economic Advisors.

The most important chapter in the report will be the one on the economic outlook.

It will say, short run, the outlook is for further drift; there will be no effort to gloss this over. But for the longer run, Eisenhower's advisors see a renewal of business expansion, coming during the latter half of 1958. It will be pushed along by increased government spending, population growth, continued high consumption and the so-called "built-in stabilizers," such as unemployment payments.

Main reliance for a business upswing will be on increased government spending. This is not what Eisenhower's advisors would prefer. The report won't say so, but they favor tax cuts as an antirecession tool.

In the '54 downturn, an $8-billion tax reduction was credited

Washington Newsletter

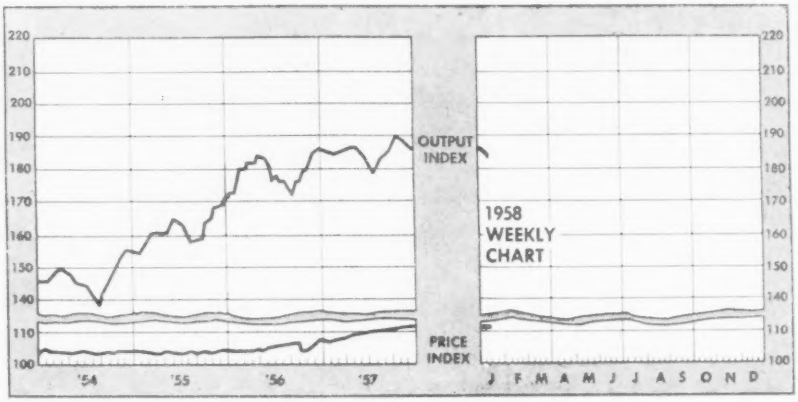
(Continued)

with a big role in the country's quick recovery. This time, however, there is no such choice. To meet Soviet advances in weapons and science, spending must go up anyway. They'll say this rise, backed up by more money for roads and a high level of spending for public works, is all the lift the economy needs.

However, hopes for possible tax reductions have been revived in Congress. Both Rep. Wilbur Mills (D., Ark.), chairman of the Ways & Means Committee, and Rep. Dan Reed, of New York, ranking Republican member, talk of voting a tax cut if the recession continues.

Mills would prefer to use a tax cut to pull the economy out of a slump rather than a big program of public works through federal spending.

There's an implied challenge to business in the report—to get busy and bring out new and attractive products that will loosen up consumer pocketbooks. The language is diplomatic, but the point is clear. In this view, much of what businessmen call overcapacity is simply capacity to turn out goods that no longer excite the customers. Eisenhower's advisors are hoping that results of recent big expenditures for research will result in orders for new tools and factories to turn out a flood of new consumer products. It's one of their main hopes for a resumption of growth on the civilian side of the economy.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	184.0	184.0	183.0
Chemical Week wholesale price index (1947=100)	111.1	111.2	106.9
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	40.26	39.60	43.67

MONTHLY Foreign Trade (million dollars)	Exports			Imports		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	117.0	105.4	99.8	N.A.	20.9	22.1
Coal-tar products	8.2	6.2	6.1	N.A.	3.8	4.4
Industrial chemicals	17.9	18.3	14.6	N.A.	6.4	7.6

Where can you use the unique characteristics of persulfates?

All peroxygens carry active oxygen in their molecules, but the persulfates offer these special properties as well: Unusually high oxidation potential, good resistance to catalytic decomposition, and a reactive anion that gives reactions quite different from those of other peroxide compounds.

You'll find persulfates have particular values in processes involving emulsion polymerization of monomers and depolymerization of organic polymers. Persulfates excel in such applications as processing color films, etching printing plates, and modifying starches; and are of interest as reactive oxidizing agents for many other purposes.

Perhaps *your* processing techniques can be improved through the use of Becco Persulfates. A Becco field engineer will be glad to discuss this with you, at no obligation . . . drop us a line. At the same time, ask for your free copy of these booklets:

Nos. 34 and 68, "Uses of Persulfates"
No. 63, "Action of Persulfates on 1, 2-Glycols"
No. 86, "Improving Properties of Copper Surfaces"

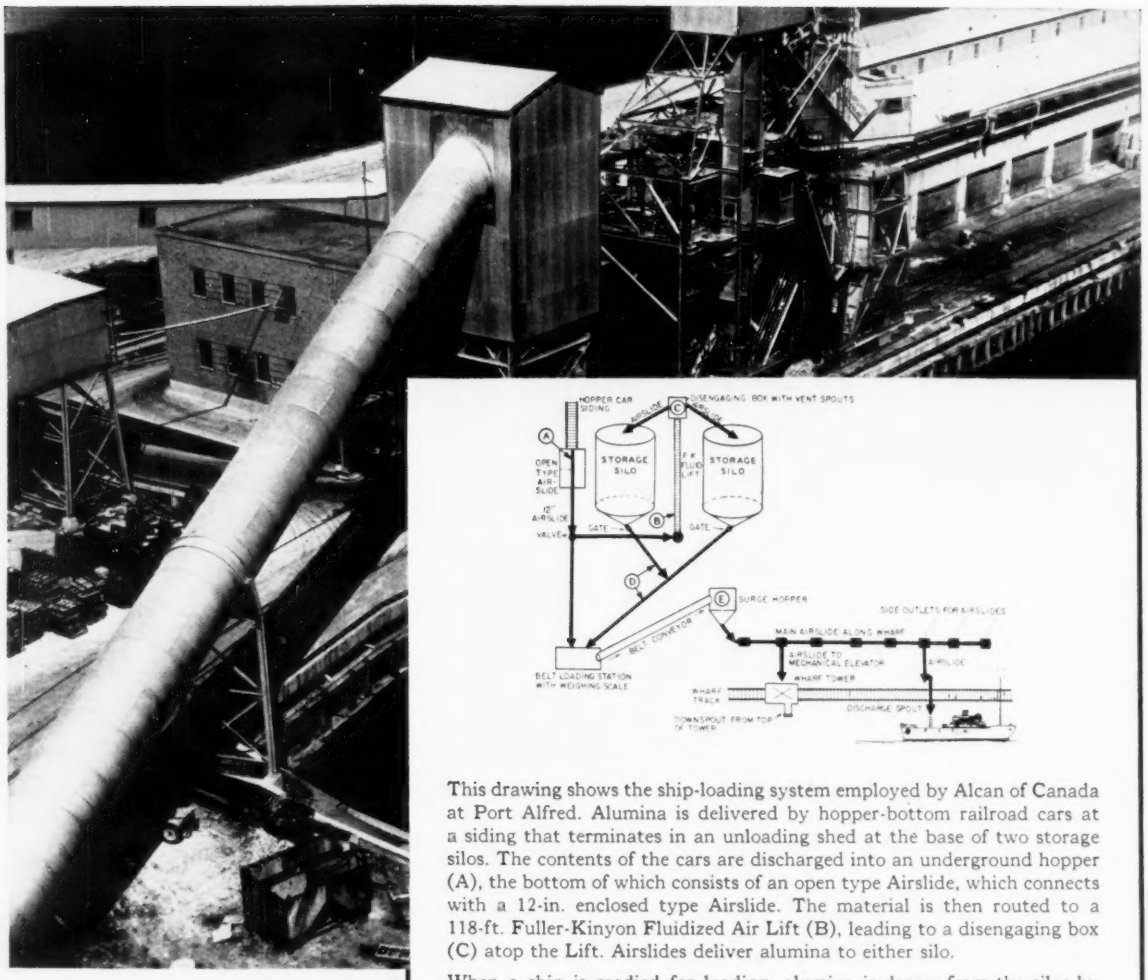
BECCO CHEMICAL DIVISION
Food Machinery and Chemical Corporation
Station B, Buffalo 7, New York
BUFFALO • BOSTON • CHARLOTTE, N.C. • CHICAGO
NEW YORK • PHILADELPHIA • VANCOUVER, WASH.

BECCO

Progress in Peroxygens

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FMC CHEMICALS INCLUDE: **BECCO** Peroxygen Chemicals • **WESTVACO** Phosphates, Barium and Magnesium Chemicals • **WESTVACO** Alkalis, Chlorinated Chemicals and Carbon Bisulfide • **NIAGARA** Insecticides, Fungicides and Industrial Sulphur • **OHIO-APEX** Plasticizers and Chemicals • **FAIRFIELD** Pesticide Compounds and Organic Chemicals



This drawing shows the ship-loading system employed by Alcan of Canada at Port Alfred. Alumina is delivered by hopper-bottom railroad cars at a siding that terminates in an unloading shed at the base of two storage silos. The contents of the cars are discharged into an underground hopper (A), the bottom of which consists of an open type Airslide, which connects with a 12-in. enclosed type Airslide. The material is then routed to a 118-ft. Fuller-Kinyon Fluidized Air Lift (B), leading to a disengaging box (C) atop the Lift. Airslides deliver alumina to either silo.

When a ship is readied for loading, alumina is drawn from the silos by open type Airslides and transported by means of 16-inch Airslides (D) to a belt, which delivers to a surge hopper (E) feeding the 400-ft. long Airslide for conveying to the ship. Air for the operation of the Fuller-Kinyon Fluid Lift is supplied by a Fuller Rotary Compressor.

Here's how ALCAN reduces ship loading time 50%

. . . FULLER SYSTEM PAID FOR ITSELF IN WEEKS

Expansion of The Aluminum Company of Canada's pneumatic conveying system at Port Alfred, Quebec, has cut ship loading time of alumina by 50 percent.

Engineered and built by Fuller, this pneumatic conveying system has eliminated frequent interruptions in the loading schedule and made possible big savings in handling cost. The initial cost of the installation was absorbed within the first few weeks of operation!

Additional equipment consists of two 35-ft. portable F-H Airslides® operating in tandem off of a main 19-in. Airslide running a distance of 400 feet along the roof of the wharf.

These Airslides discharge the alumina directly into the hold of the ship, eliminating the time-consuming shutdown during relocation of the bucket elevator and tower for delivery to various holds.

This carefully planned system points out how Fuller's more than 30 years of specialized experience in engineering and manufacturing pneumatic materials-handling equipment helped another company save time and money. We would like to put our facilities to work for you, too. Write, giving us details of your operations.

SEE CHEMICAL ENGINEERING CATALOG
FOR DETAILS AND SPECIFICATIONS

G-167
4365

FULLER COMPANY GENERAL AMERICAN TRADE MARK

Fuller
. . . pioneers in harnessing AIR

FULLER COMPANY
144 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
Birmingham • Chicago • Kansas City • Los Angeles • San Francisco • Seattle

Tranquilizers find new use in drug combinations

FORMULA	INDICATION	MANUFACTURER
Thiamine mononitrate, vitamin B_{12}, reserpine	Promote weight gain in children	Purdue Frederick
Isopropamide iodide, prochlorperazine	Gastrointestinal disturbances involving emotional stress, nausea	Smith, Kline & French
Dextro-amphetamine sulfate, chlorpromazine	To allay depression and anxiety	Smith, Kline & French
Prednisolone, meprobamate	Arthritis	Merck Sharp & Dohme
Pentaerythritol tetranitrate, hydroxyzine	Preventive management of angina pectoris	J. B. Roerig, division of Chas. Pfizer
Pethidine, daptazole, mepazine	Anesthetic	(experimental)*
Mepazine, reserpine neostigmine	Tranquilizer (reduced side-effects)	(experimental)*
Mecamylamine, meprobamate	High blood pressure	(experimental)*
Tridihexethyl iodide, meprobamate	Ulcers	Lederle Laboratories, division of American Cyanamid
Prednisolone, hydroxyzine	Bronchial asthma, arthritis, allergies	J. B. Roerig, division of Chas. Pfizer
Dextro-amphetamine sulfate, chlorpromazine	Antidepressant	Smith, Kline & French
Mepazine, chlorpromazine	Tranquilizer (reduced side-effects)	(experimental)*

*Clinical studies have been reported.

New Frontiers for Chemical Calmers

The products (above) are first fruits of research in using tranquilizers as adjuvants to enhance the therapeutic value of other drugs. If successful, such research might help double the present $200-million/year tranquilizer market in a few years. And this week, the chance of success looks very good indeed.

One big reason is the discovery that the combinations have promising applications in veterinary as well as human medicine. That was underscored by the recent findings that Pfizer's still-experimental Pran-Q form of hydroxyzine, used with diethyl stilbesterol, has a synergistic effect in promoting weight-gain in lambs and beef cattle. Earlier, Pfizer turned up similar results using reserpine, Terramycin and stilbesterol (*CW, Aug. 31, '57, p. 44*).

Commercial Entries: Already, several firms offer tranquilizers in combination with other drugs. In formulations under the tradename Atarax, Pfizer's hydroxyzine is gaining a foothold in human adjuvant therapy. Combined with pentaerythritol tetranitrate, in a new product called Cartrax,

IT'S HERE! AMERICA'S

pro-

NOW IN

The world's largest commercial plant to produce polypropylene is now on stream. Pro-fax, Hercules polypropylene, is the most significant new plastic to be developed in years. It has a lower specific gravity than any other plastic material commercially available. Pro-fax has higher tensile strength, hardness, heat resistance, stiffness, resilience and clarity, coupled with the inertness and water resistance typical of a hydrocarbon polymer. Pro-fax is exceptionally easy to mold, yielding parts with a hard, glossy surface available in a broad range of colors.

Among the other important properties of Pro-fax are excellent resistance to grease and oil, water, and many common acids; outstanding electrical properties; and higher impact strength. Altogether, Pro-fax combines more desirable properties than any other plastic now marketed.

There's sure to be a place for Pro-fax in your picture. For further information on properties and uses, call or write Hercules.

NOW THERE ARE TWO

Pro-fax is the Hercules trademark for polypropylene, a hydrocarbon polymer, based on propylene and a new Hercules process. Pro-fax will complement the usefulness of Hi-fax®, Hercules high-density polyethylene, greatly broadening the available markets for plastics, especially those now served by wood and metal.

Pro-fax is the second of many new polymers resulting from a Hercules research program designed to explore the chemical horizons opened by the development of organometallic catalysis systems. Others will follow as Hercules continues its leadership in the important field of polyolefin chemistry.

Cellulose Products Department

HERCULES POWDER COMPANY
INCORPORATED

900 Market Street, Wilmington 99, Delaware

CP58-1

FIRST POLYPROPYLENE

fax

HERCULES TRADEMARK

COMMERCIAL PRODUCTION

the tranquilizer helps prevent *angina pectoris* by relaxing coronary arteries, reducing anxiety and apprehension It is not meant to replace nitroglycerine therapy for acute attacks, says Pfizer, but instead is intended to obviate the need for it.

An older Pfizer product, Ataraxoid, combines Atarax and prednisolone, helps reduce symptoms in rheumatic arthritis, bronchial asthma and severe allergies. Merck Sharp & Dohme gets similar results with its prednisolone-meprobamate (Miltown) called Meprolone. Says Merck, "It works well, sells well."

Miltown, developed by Wallace Laboratories, division of Carter Products, Inc., is also the choice of some other researchers because of its apparent high efficacy, low toxicity. Lederle combines it with an anticholinergic in a product it calls Pathibamate tridihexethyl iodide-meprobamate.

In preliminary clinical trials, Pathibamate has reportedly proved successful in more than 150 patients having such conditions as duodenal and peptic ulcers. (There are an estimated 10 million ulcer sufferers in the nation.) However, Lederle, which makes no tranquilizer of its own, reports it is not actively researching further combinations.

Hospital Tests: At least one other meprobamate combination, though, is known to be potentially useful. Cardiologist Harvey Nussbaum, at the Cardiac Clinic of St. Barnabas Medical Center (Newark, N.J.), recently wound up 17 months of clinical tests using Miltown plus the nerve-blocking drug, mecamylamine, to treat high blood pressure. Results: 95% of his patients were helped by the combination. Miltown itself had little effect on blood pressure (although in some patients it appeared to add to mecamylamine's hypotensive effect). Its principle benefit: "a helpful relaxant effect."

Some Reluctance: Despite the seemingly high market potential of tranquilizer adjuvants, not all drugs firms are investigating them. Companies having no basic position in tranquilizer-making (e.g., Lederle) have so far shown the least interest. Some other firms are reluctant to admit whether combinations of tranquilizers are being studied.

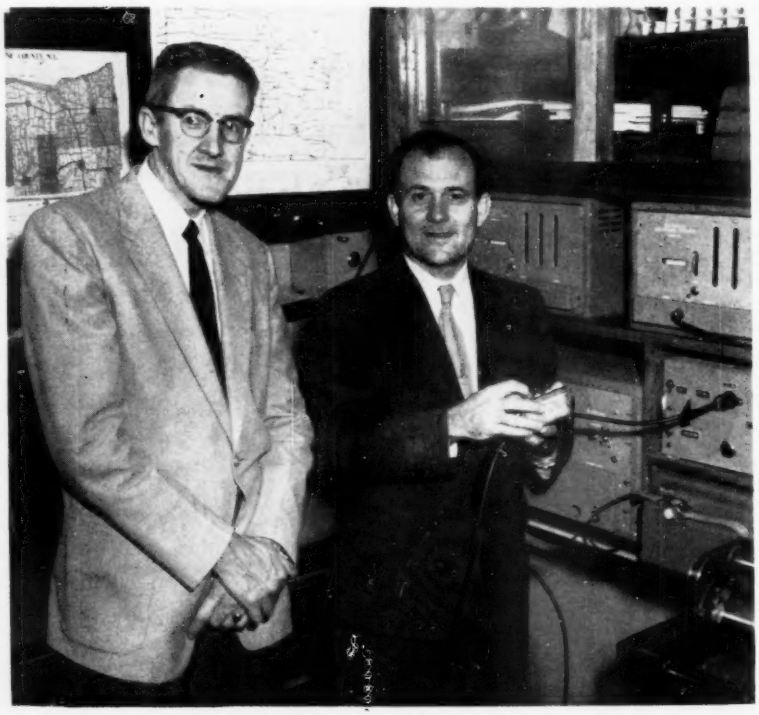
Still others—e.g., Bristol Laboratories (Syracuse, N.Y.)—have not yet been able to schedule research on the combinations. Last summer Bristol launched its PRN (phenyltoloxamine) tranquilizer (*CW, July 13, '57, p. 78*) —which was sold previously as an over-the-counter antihistamine. Bristol tells *CW* it has no immediate plans to investigate the drug's adjuvant properties, although it doesn't rule it out for future research—and says PRN "might be a natural" for combinations.

Firms with an aim toward expanding the markets for their currently produced tranquilizers have strongest interest in adjuvant applications, of course.

New tranquilizers now coming along might eventually upset this forecast, snare a share of the adjuvant market. At present, however, drug firms still decline to talk about such plans for the newcomers.

Built-in Relaxer: Adjuvant research is being carried to its logical extreme —finding ways to build tranquilizer properties right into a given drug. This was done recently at Lakeside Laboratories, Inc. (Milwaukee). Lakeside chemists report development of an "abdominal tranquilizer" for peptic ulcers. A piperidol compound, it not only staves off nervous stimulation of the digestive tract but also prevents oversecretion of ulcer-goading enzymes and acid.

But such drugs are likely to remain a rarity. Instead, there will be a lot more research toward finding ways to improve presently effective medicines with presently available tranquilizers.



Kodak's White and MacAdam: In color matching, new precision.

Better Color Match

It's hard to rival the human eye when it comes to sorting colors—it can distinguish 2 million distinct color shades. But a couple of new machines, developed at Eastman Kodak (Rochester, N.Y.), are giving the task a try.

The machines, designed to help improve color film materials, are for research only; Eastman doesn't plan to manufacture or sell either of them.

One instrument, reputedly the first of its kind, is called a portable telescopic visual colorimeter. It is intended to measure the colors of an

GET AHEAD with . . . "YEARS-AHEAD" . . .

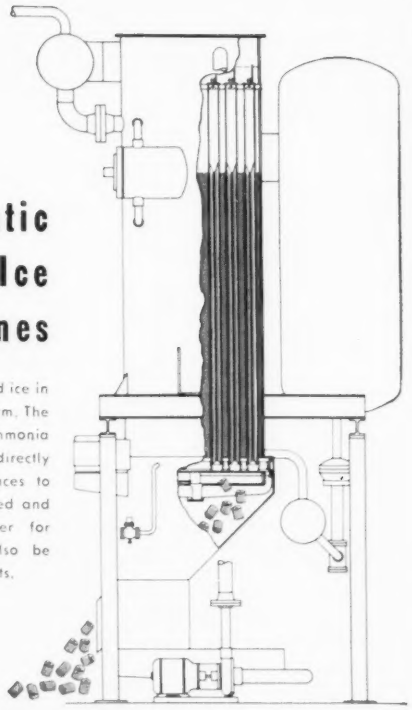
Vogt

ICE MAKING and REFRIGERATING EQUIPMENT

. . . for the preservation of foods and beverages during process and in storage. Petroleum refineries, chemical plants, and related industries also employ this equipment in various processes. In addition to equipment shown here, we manufacture liquid receivers, pipe coils, and valves, fittings, and flanges, for refrigeration as well as for high pressures and temperatures. Bulletins on request. Address Dept. 24A-RICW.

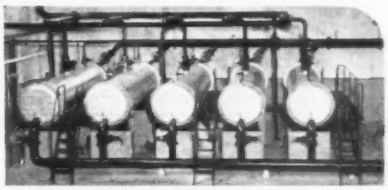
Automatic Tube-Ice Machines

Make clear, hard, sized ice in cylinder or crushed form. The refrigerant, either Ammonia or Freon, is applied directly to the freezing surfaces to produce ice with speed and economy. Cold water for process work can also be supplied by these units.



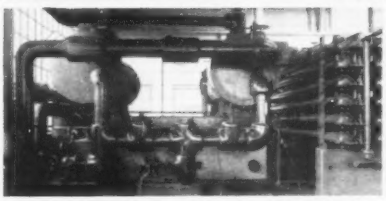
Refrigeration Condensers

Available in horizontal multipass shell and tube types and vertical single pass types for Ammonia or Freon refrigerants. Special metals, lined tubes, etc. can be furnished for unusual operating conditions.



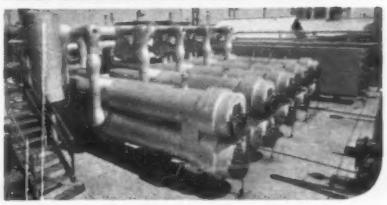
Brine Coolers

Multipass type brine coolers are ideal for closed brine systems in cold storage plants, dairies, packing plants, petroleum refineries, etc. requiring units of large capacity. Also suitable for cooling non-corrosive liquids in general.



Scraped Surface Exchangers

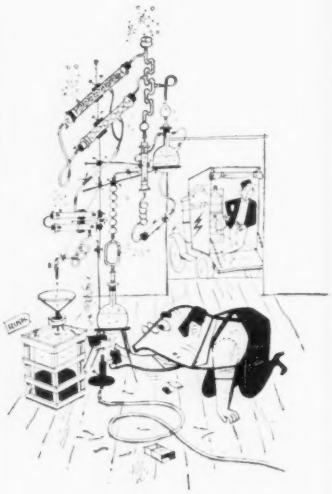
Continuously revolving scrapers sweep heat transfer surfaces clean and keep solids in suspension. Useful in problems of heat transfer with crystallization with high viscosity, or with solvent extraction. Available in double pipe and shell and pipe construction.



HENRY VOGT MACHINE CO., Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati

OTHER VOGT PRODUCTS ▶ DROP FORGED STEEL VALVES, FITTINGS AND FLANGES IN A COMPLETE RANGE OF SIZES • PETROLEUM REFINERY AND CHEMICAL PLANT EQUIPMENT • STEAM GENERATORS



It's better to get it from Eastman . . .

Sure, when you need an uncommon organic (or an uncommonly pure one) in more-than-test-tube and less-than-tank-car quantities, try Eastman Organic Chemicals Department, *Distillation Products Industries,* Rochester 3, N. Y.

DPi

there are some 3500 Eastman Organic Chemicals for science and industry

DISTILLATION PRODUCTS INDUSTRIES
is a division of
EASTMAN KODAK COMPANY

actual scene by comparing them with standards. Later, the colors of photographs of the scene can also be measured. The instrument, which requires the human eye as comparator, gives precise results in both field and lab, Eastman reports.

How It Works: The unit is aimed at a specific color region. To the operator peering through its telescopic sight, the color to be measured appears as a circle surrounding a smaller circle of an arbitrary color. The operator then adjusts the instrument so the colors of the two circles match. Then, from calibrated dials, he reads the amounts of primary colors and intensity of illumination required for the match.

Integrator: Eastman's other machine, not portable, is intended to match colors at high speed and with great precision. Developed by William White and David MacAdam of Kodak Research Laboratories, it is called a universal digital tristimulus integrator,* determines how the average human eye will see a color under various lighting conditions (e.g., fluorescent light, sunlight and tungsten light).

Color-matching instruments, of course, are nothing new. General Electric, for example, came out with a tristimulus integrator in '49 for use with a GE spectrophotometer. (The integrator was built for GE by Librascope, Inc., Glendale, Calif.) But precise mechanical color-matching of some materials and surfaces (notably textiles) is a continuing research problem.

APPARATUS

Vacuum Furnace: A versatile new vacuum furnace for metallurgical research is available from Kinney Mfg. Division, New York Air Brake Co. (Boston, Mass.). Called the F-15 furnace, it can be used for melting, casting, annealing, alloying, sintering, heat treating, crystal growing.

•

Separator: Carpco Mfg., Inc. (Jacksonville, Fla.) is out with a new laboratory model electrostatic separator. The unit operates on 115-volt, 50/60-cycle ac., is designed for food, seed and plastics labs.

*The three stimuli considered, and for which Eastman can establish specific values, are the type of light, the reflectance of the material involved, and the typical human reaction to such reflected light.

EXPANSION

• American Smelting and Refining Co. (New York) is completing a new asbestos research laboratory in South Plainfield, N.J. Asarco will research new uses for asbestos, which will be produced at a projected 100,000-tons a year pace, at Black Lake, Que.

• Shell Oil Co. (New York) will build a new research lab at Norco, La., tripling existing research facilities there.

• Gordon and Campbell (Morristown, N.J.) is a new consulting firm specializing in thermoanalytical research techniques.

• Georgia-Pacific Corp. (Hillsboro, Ore.) has recently centralized its wood research facilities at Hillsboro.

• Paint Research Institute Inc. is a newly established subsidiary of Federation of Paint and Varnish Production Clubs (Philadelphia), plans to engage in basic research in the paint and varnish field and to conduct short-term research aimed at creating new paint markets.

• Sumner Chemical Co., a division of Miles Laboratories, Inc. (Elkhart, Ind.), has reorganized its research and development functions, now has research labs in Elkhart, Ind., and Zeeland, Mich., and a pilot plant in Zeeland.

PRODUCTS

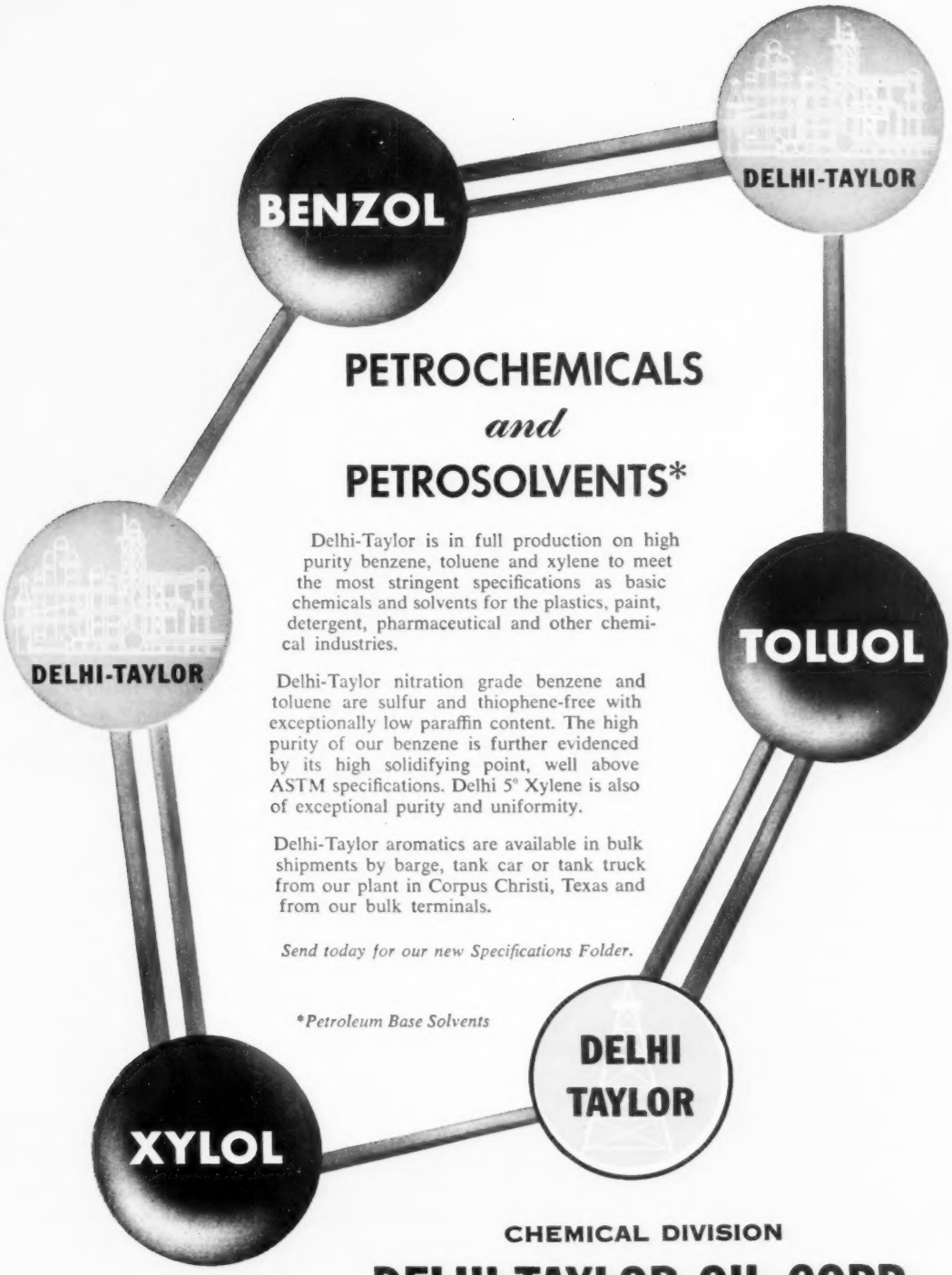
Coating Candidate: For possible use in industrial coatings, Shell Chemical Co. (New York) now offers drum quantities of a new development chemical called Resinous Polyol X-450. Chemically, it is poly (1-phenyl, 3-hydroxymethylbutene), and coatings made with the resin are said to feature high clarity and caustic-resistance.

•

Wool Wax Insulator: Improved dielectric loss, insulation resistance, dielectric breakdown strength, and capacitance is available when wool wax is substituted for petroleum jelly in paper capacitors, according to the Division of Electrotechnology, Commonwealth Scientific and Industrial Research Organization, Australia.

•

Intermediate Debut: Cowles Chemical Co. (Cleveland) now offers *m*-toluic acid made by its new process, is preparing to produce *o*-toluic and *p*-toluic acids soon.



PETROCHEMICALS *and* PETROSOLVENTS*

Delhi-Taylor is in full production on high purity benzene, toluene and xylene to meet the most stringent specifications as basic chemicals and solvents for the plastics, paint, detergent, pharmaceutical and other chemical industries.

Delhi-Taylor nitration grade benzene and toluene are sulfur and thiophene-free with exceptionally low paraffin content. The high purity of our benzene is further evidenced by its high solidifying point, well above ASTM specifications. Delhi 5° Xylene is also of exceptional purity and uniformity.

Delhi-Taylor aromatics are available in bulk shipments by barge, tank car or tank truck from our plant in Corpus Christi, Texas and from our bulk terminals.

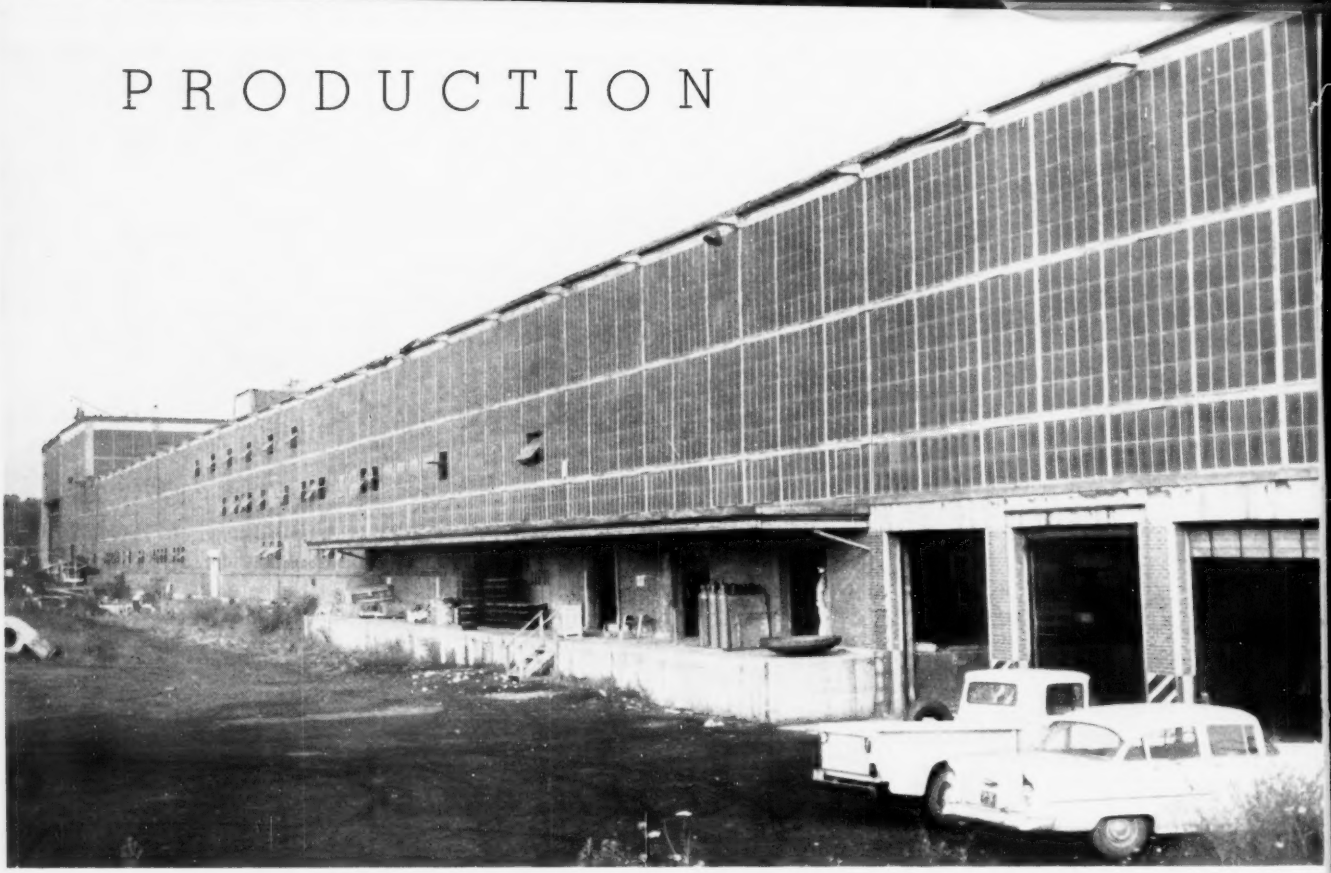
Send today for our new Specifications Folder.

**Petroleum Base Solvents*

CHEMICAL DIVISION

DELHI-TAYLOR OIL CORP.

415 Madison Ave. • New York 17, N. Y.



Large foundry building at Ashtabula, O., is converted to zirconium and titanium facility by USI's fast

Swift Decision Means a Big Saving

This week, the first installment on a construction savings of more than $1 million and six month's time is all but realized. It is the now-onstream 2-million-lbs./year zirconium plant of Mallory-Sharon Metals Corp. at Ashtabula, O., where U. S. Industrial Chemical Co.'s production department is ironing out last details of the reduction stage.

Key to the saving is a bold, whirlwind decision made a year and a half ago by USI. In one week's time, it decided to scrap its planned layout for a zirconium plant in favor of trying to fit both zirconium and titanium processing units into an already-existing $1.8-million foundry building that was up for sale.

Only now, with success of the zirconium plant assured, and the titanium unit in the final construction stage, is USI willing to discuss details of its gamble.

The part of the plans-change involving titanium was easy for USI, which is the builder and manager of the plant (USI is one-third owner of Mallory-Sharon Metals). The titanium project was still in the embryo stage. But zirconium plans had already reached the point where steel was being detailed. And the single week allowed for decision on the foundry naturally left even less actual time for the USI team to evaluate the structure.

Flying Team Effort: "We learned of the buildings (Bellanca's Lake City Malleable) availability on a Friday," says Werner Muller, manager of project development. "We got our evaluation team together and boarded a company plane at 8:30 the next morning at Westchester airport, flew to Erie and drove to Ashtabula. We spent five or six hours at the foundry, worked during our luncheon, were back at Westchester airport about 7 or 8 that night. By that time, the basic decision had been reached, though a lot more figuring had to be done back in New York before the building was actually bought."

In addition to Muller, the evaluation team included Robert Hulse, executive vice-president of parent National Distillers and general manager of USI; Robert Cornwell, USI's vice-president of production; John Atwood, manager of chemical engineering*; a legal counsel and two representatives of Bechtel, the construction firm. With one change—Atwood left USI a few months later, and his post was taken by James Couch—the four USI team members continued to be the top level decision-making group for the project.

Big factor aiding the rapid evaluation of the build-

*USI's manager of chemical engineering is responsible for design of physical facilities; the manager of project development is responsible for process design.

layout changes to fit building's interior.

in Construction

ing was this top-level USI group's familiarity with details of the zirconium process. Some of the questions that came up during the decisive hours in the foundry had been answered during the original planning.

For example, plans for the zirconium-hafnium separation step based on the Bureau of Mines-developed solvent extraction technique, required an 80-ft. ceiling area to accommodate extraction columns of optimum design. The foundry building was only 26 ft. from floor to bottom of the roof's structural steel in 60-65% of the building, and 46 ft. in the remaining areas.

The group knew, however, that column height could be reduced if the number of columns was increased—although it would mean some increase in equipment cost. (Ultimately, 45-ft. columns were erected.)

Equipment Jugglers: The explosion hazard of the methyl-isobutyl ketone solvent in the zirconium-hafnium separation stage, and the corrosion problems of the zirconium chlorination stage had prompted USI to design a three-building layout to isolate these areas. At the foundry the evaluation group had to devise a preliminary layout that would maintain the area separation and provide space for the titanium plant, all within one large foundry area (three 80-ft. bays wide and 700 ft. long) with attached shed.

Decision-makers huddle over new plant blueprints—left to right, Hulse, Muller, Cornwell, Couch.

New plant's manager, C. K. Turner (left), follows construction progress with aid of blueprints.

Steel structure goes up, adapting one-level area in former foundry to multiple-level processing.

spray-dried perfumes perfected by D&O

There is now a simple answer to the difficult problems involved in perfuming *powdered bleaches, dry detergents, soap powders, household* and *specialty cleansers, scouring powders* and other similar products. D&O has applied its own, unique spray-drying technique to perfume oils and compounds with the result that fragrance can now be locked-in . . . just as surely and permanently as flavor. The use of such spray-dried perfumes, vastly increases the shelf-life of the scented product . . . and assures that the fragrance is absolutely intact when it reaches the consumer . . . regardless of storage time. Upon its first contact with water . . . the full, rich perfume is released in all its original strength and depth. D&O has named its new group of locked-in perfumes – "FRAGRANCE-SEAL"– and trial quantities are available in all aromatic types for individual manufacturer testing. Write today.

Essentially for you

D&O ESTABLISHED 1798

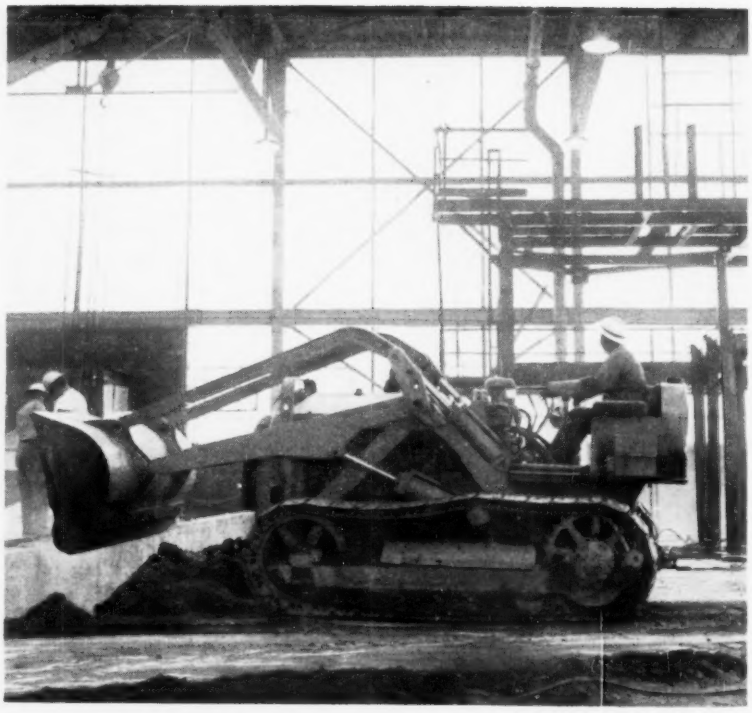
OUR 159TH YEAR OF SERVICE

DODGE & OLCOTT, INC.

180 VARICK STREET • NEW YORK 14, N.Y.

SALES OFFICES IN PRINCIPAL CITIES

Essential Oils • Aromatic Chemicals • Perfume Bases • Flavor Bases • Dry Soluble Seasonings



Indoor construction saved time by solving bad-weather problems.

"It took a lot of fast, rough sketches —with and without reference to the plans we brought—before we had the partitions located and equipment juggled to fit our process requirements," says Muller.

Three-Dimensional Juggling: And because process flow pattern required multiple-level construction at several stages, the best location for intermediate levels in the one-story building had to be considered along with the juggling, Muller adds.

But some of the usability factors were more simply evaluated. Included in the foundry offer were an office building, maintenance shop area, water tower, railroad siding, steam, electric and compressed-air supplies. These additional facilities were all considered usable to some extent.

The steam supply had to be augmented—its principal use had been for space heating. On the other hand, the electrical transformer capacity—7,500 kw.—was ample there. Because the load distribution for the zirconium plant was different than for the foundry, however, USI had to change the secondary switch equipment. But the big problem—long delivery dates on transformers—was solved.

And the building itself solved several problems. USI no longer had to scour the country, during a period of shortage, for large quantities of structural steel. The partitions (concrete block curtains) were less expensive than outside-wall construction for three buildings. Tunnels beneath the foundry floor that had housed a conveyor system for shaking sand out of flasks were used for electrical conduit.

And, with a building shell already up, construction crews could work indoors during bad weather. Only the facilities that were to be constructed in addition to the three main process buildings of the original plan (e.g., storage tanks, argon unit) required major outdoor work by the construction crews.

On the negative side: glass outside walls. USI sees these as an irksome maintenance task. (One comment: "It might be simpler to wait until the glass panes break and replace them than to try to keep them clean.")

But operating within glass walls is a minor inconvenience that can't alter USI's pride in its solid savings resulting from a swift decision to scrap settled building plans.

IF YOU'RE just beginning to manufacture alkyd or polyester resins — or an "old-hand" producer with some production problems still unsolved — Pittsburgh's Technical Service Department may be of real service to you.

As a dependable source of phthalic anhydride, maleic anhydride and fumaric acid, we're well experienced — and *ready* — to assist you with your application problems.

This help goes well beyond "samples and data sheet" on our products — which are always available, of course. We'll be glad to make up sample resins, suggest formulations for your special requirements, and recommend sound processing procedures.

And, when the problem calls for it, our engineers are at your service for a trouble-shooting meeting at your plant. Pittsburgh is *not* a commercial resin producer.

What's your resin production problem? We'd like to help you lick it. *Call or write us the details today.*

COAL CHEMICALS • PLASTICIZERS • PROTECTIVE COATINGS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Their hats are off to...

TRIANGLE BRAND COPPER SULFATE

PHELPS DODGE REFINING CORPORATION · NICHOLS · TRIANGLE BRAND · REG. U.S. PAT. OFF. · CHEMICALS · NEW YORK

Yes, nine important industries count on versatile copper sulfate

PIGMENT MANUFACTURING

As a starting material for making green and blue pigments, such as Brunswick Green, Scheele's Green, etc.

WOOD PRESERVING

As a superior wood preservative—inexpensive and long lasting. Prevents decay and termite damage.

PETROLEUM

As a reagent for the oil sweetening process and as a catalyst in the production of high octane gasoline.

TEXTILE

As a mordant in textile dyeing and calico printing.

PLATING

As an electrolyte for copperplating and for coloring metals.

MINING

As a flotation reagent in the treatment of lead and zinc ores.

AGRICULTURE

As an active ingredient of Bordeaux Mixture sprays and dusts for the control of plant diseases and as an ingredient in fertilizers for copper deficient soil.

WATER WORKS

As an algacide to clarify water and to eliminate root and fungus growth in sanitary sewers and storm drains.

CHEMICAL MANUFACTURING

As a raw material used in making copper chemicals and compounds.

We will be happy to send detailed information on Triangle Brand Copper Sulfate.

Phelps Dodge also serves industry with

BASIC COPPER SULFATE · NICKEL SULFATE · SELENIUM · TELLURIUM

PHELPS DODGE REFINING CORP.

300 PARK AVE., NEW YORK 22, N.Y. • 5310 W. 66th STREET, CHICAGO 38, ILL.

PRODUCTION EQUIPMENT

Liquid-Metal Pump: Westinghouse Electric Corp.'s (Pittsburgh) atomic equipment department is out with a new canned pump for circulation of liquid metal in high-temperature liquid-metal-cooled reactors. The pump, which follows the same design principles used for pumps on the *U.S.S. Nautilus*, is offered in capacities from 150 to 5,000 gal./minute for operating temperatures to 1600 F.

•

Quick-Fastened Insulation: Its new #101 high-temperature pipe insulation has built-in wires, which eliminate the need for tie wires, speed fastening to large-diameter lines, says Baldwin-Hill Co. (Trenton, N.J.). Of spun-mineral-wool construction, faced with metal fabric of 16-gauge wires, the insulation will withstand temperatures to 1200 F. The insulation is fastened by hooking the wires, which extend from one end of the outer mesh fabric under the stay wire on the opposite end of the fabric. It is available in 2-ft. sections in 1½- to 4-in. thicknesses for 4- to 30-in. pipe.

•

Acetylene Generator: Union Carbide Corp.'s Linde Co. (New York) has recently developed Oxweld MP-11, an acetylene generator with an automatic howler and indicator lights to warn of minimum carbide supply, water level or water-temperature change. The generator has automatic carbide-and water-shutoff system, pressure relief valves and hydraulic back-pressure valve. Carbide capacity: 500 lbs.; production rate: 1,000 cu.ft. an hour of medium-pressure acetylene or 2,000 cu.ft./hour for shorter, intermittent operation. With standard regulating equipment, MP-11 can be used to supply low-pressure acetylene to a piping system.

•

Liquid-Level Control: A new air-operated control system offered by Powers Regulator Co. (Skokie, Ill.) is said to keep liquid levels from varying more than one-quarter inch. System uses bubbler on air line placed below the surface of the liquid. When liquid level drops, pressure on bubbler tip is reduced. Pressure change transmitted to static-pressure regulator causes regulator to reposition liquid control valve. Liquid-level can be adjusted over a 1½-in. range.

SNOW JOB.....

By Snow Generator or By Direct Injection,
The Liquiflow CO_2 System Insures

ABSOLUTE PRODUCT TEMPERATURE CONTROL IN PULVERIZATION

- Assures the uniform refrigeration required in size reduction on chemicals, resins, plastics, pharmaceutical products, antibiotics, sugar, spices and heat sensitive products.
- Effectively inerts flammable materials during milling by lowering the oxygen concentration.
- Milling capacity is greatly increased by use of Liquiflow (liquid CO_2 system).

HOW WILL CO_2 HELP YOU MOST?

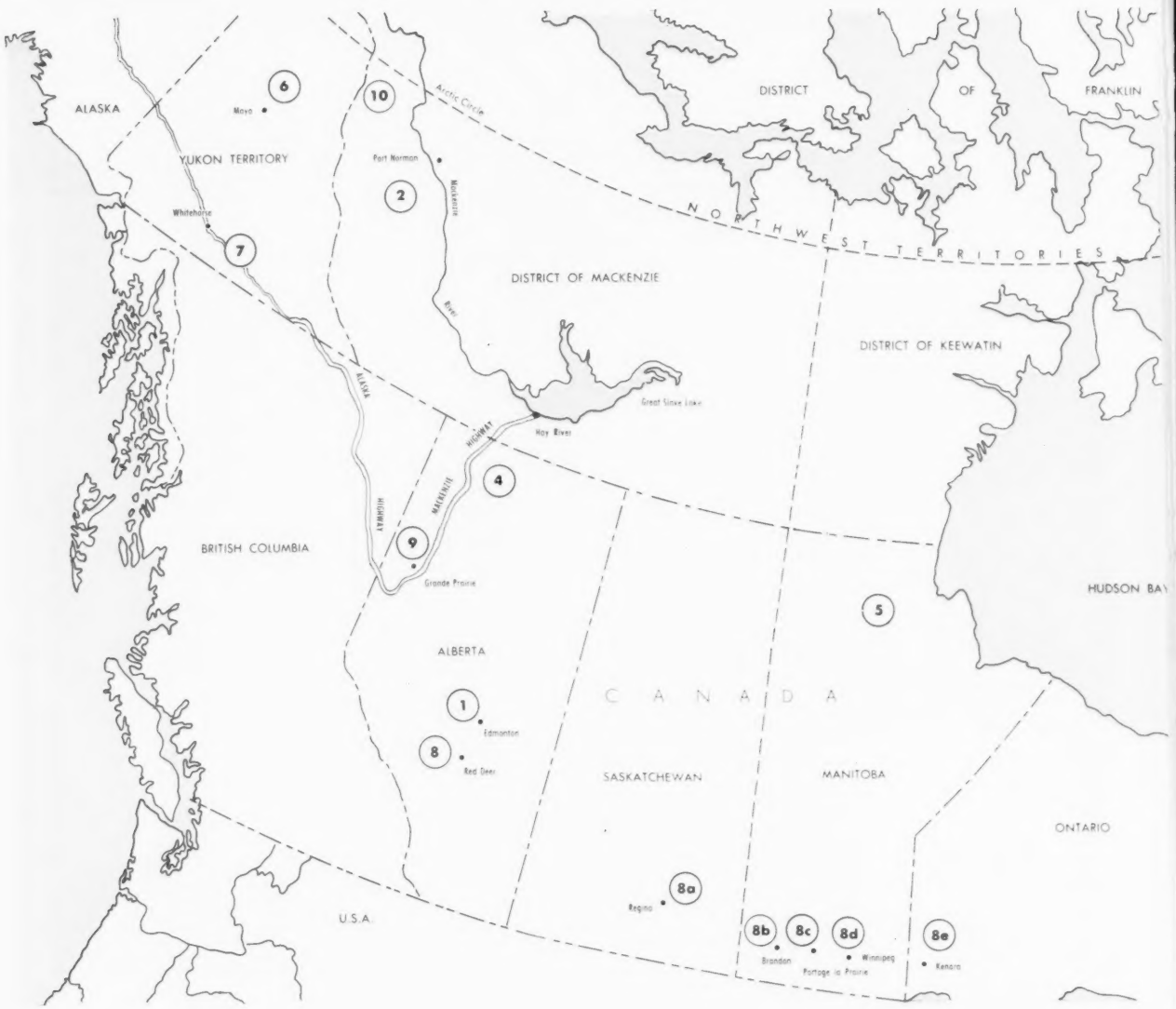
Write for free booklet "Applications Unlimited" which describes pulverization and dozens of other uses for CO_2. We will also send complete information on the Liquiflow system.

World's Largest Producer of CO_2

LIQUID CARBONIC

DIVISION OF GENERAL DYNAMICS CORPORATION

3104 S. Kedzie Avenue
Chicago 23, Illinois



Development of Canada's mineral-rich Northwest Territories has been stepped up, resulting in new export

Canadian Discontent: Will It Bar the North-

U.S. chemical process companies this week are considering substantial new export and investment opportunities in Canada's Northwest Territories. But a big question mark hangs over any potential moves: To what extent will they be permitted to participate in developing these resources?

The opportunities stem from the stepped-up exploration and development of Canada's mineral-rich northland (*see map*). The Canadian government reportedly spent some $31 million there last year; private capital will soon spend much more.

Possibility that U.S. participation might be limited arises from the fact that U.S.-Canadian economic ties are presently under a severe strain because of official and unofficial Canadian dissatisfaction with certain U.S. trade policies.

Latest U.S. action to threaten economic cooperation with our northern neighbors: the Administration's decision to extend voluntary quotas on foreign oil imports, including Canadian crude, into five Far Western states. This action has been labeled by some Canadians as "the last straw" in a series of U.S. actions considered harmful to the Canadian economy. Spokesmen on both sides of the border predict some sort of Canadian retaliation as a result.

Other objections by Canadians: sale

New resource developments in Canada's Northwest

1—Nucleus of petrochemical industry using natural gas.

2—Norman Wells: 27 wells supplying territory's oil needs.

3—Deposits of titanium, copper, gold, nickel, feldspar, mica and iron ore.

4—Oil-bearing area.

5—Rich nickel deposits.

6—$4-million power plant serving lead, silver and zinc mines in area. New $500,000 unit under construction.

7—$7-million power plant under construction.

8, 8a-8e—Sites selected or under study for new petrochemical facilities.

9—Uranium developments.

10—Major oil reservations in Peel Plateau area.

and investment opportunities for U.S. process concerns. The poser . . .

west Door for U.S. Business?

of surplus U.S. wheat in foreign markets and the threat of higher U.S. tariffs on nonferrous metals. Both allegedly pose trouble for Canadian industry and agriculture.

Canadian Obstacles: Not all the factors straining U.S.-Canadian economic ties result from this country's trade policies, however. There's Prime Minister John Diefenbaker's policy of "Canada for Canadians" (*CW, July 20, '57, p. 47*).

Diefenbaker seeks to bring about: (1) closer ties with England and the British Commonwealth, less reliance on U.S. trade; (2) greater economic participation by Canadians in Canada's industrial development, less foreign economic participation and control (particularly in the development of natural resources); and (4) greater industrial self-sufficiency in such industries as chemicals.

To help achieve this policy, Diefenbaker appears ready not only to shift much of his country's trade from the U.S. to the Commonwealth but also to impose stiffer tariffs on such items as chemicals and allied products.

Opportunities Remain: But despite discontent and Canadian policies, vast opportunities are being uncovered in the Canadian Northwest, from which many U.S. process companies are already in a position to benefit. Direct U.S. investments in that country now total over $12 billion, and U.S. concerns and investors own 50% of the $1-billion/year Canadian chemical industry. In addition, over $250 million worth of U.S. chemicals and allied products are shipped to Canada annually.

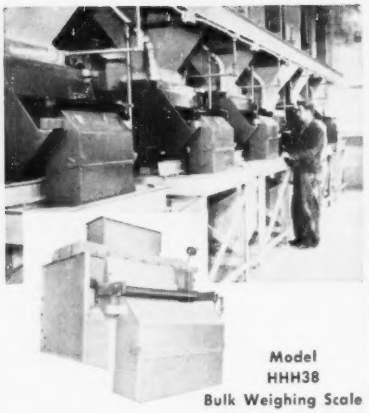
One opportunity for U.S. chemical companies is certain to come from the increased need for mining chemicals, which has resulted from stepped-up mining operations along the northern frontier. In addition, increased demand is expected from expanded capacities of existing Canadian processing plants in the provinces. Not only will there be a need to import more chemicals; the increased mining operations will also create a demand for on-the-spot production of these chemicals.

The volume of chemicals used in Canadian mining is already impressive and will increase. For example, the process of leaching—which is becoming increasingly more important in the recovery of the newer metals such as uranium—calls for ammonia, muriatic acid, chlorine and caustic soda. Uranium mining and refining is the fastest-growing part of the Canadian metallurgical economy, and most of the mines have decided on the sulfuric acid leaching process in recovery of the metal. As a result, new plants are springing up to supply the chemical demand.

Government Leads: The Canadian government has taken the lead in the exploration and development of the Northwest Territories, but there will still be substantial need for private capital.

Indicating the significance the government places on the area, Major General H. A. Young, deputy minister of public works (Ottawa), said it has "the greatest base metal potential anywhere in the Western Hemisphere."

The government has indicated its



Model
HHH38
Bulk Weighing Scale
—a versatile unit for single or multi-scale operation

MAINTAIN
TOP QUALITY
PRODUCTION

Don't Overweigh—
Don't Underweigh

Richardson High Speed Automatic Scales Provide Close Weighing Accuracies!

Richardson Bulk Scales for weighing dry, granular, small lumpy, crushed, or powdered materials are specifically designed for long term accuracy in unit weighing, process weighing and proportioning operations. They can be economically operated under virtually any type of control, as a single unit, or as one of a battery of similar units. All the operator need do is set the controls for any particular operation.

Richardson Scales are available to weigh bulk quantities at speeds that will suit your operations, with average accuracies from 0 to ± 3 ounces. You'll find Richardson Scales economical because production costs are sharply reduced, product quality is improved and there are big savings in materials.

The high quality and dependable operation of Richardson Scales is backed by a national service organization to keep your scales in prime condition and to advise you on special weighing problems. More than 55 years' experience in the business of materials handling by weight qualifies Richardson to serve you wisely and well. Let us put our knowledge to work for you. Write for further information today.

Richardson Scales conform to U.S. Weights and Measures H-44 for your protection

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

Sales and Service Branches in Principal Cities
RICHARDSON SCALE COMPANY, Clifton, N. J.
Also manufactured in Europe to U.S. Standards

faith in the potential of the region by annually placing 175-200 survey parties in the area, improving transportation (including extension of the Whitehorse-to-Mayo highway another 115 miles in the Yukon) and constructing power facilities to serve the expanding mining industry.

Exploration by private enterprise is active and has been encouraged. Recently, the government granted to private companies three major mining reservations in areas containing copper and nickel deposits, and two major oil reservations at Peel Plateau (*see map, location 10*).

It is evident that Canada is bent on speedy development of its Northwest Territories. It's equally evident that the chemical industry will have to speed up growth of its allied operations to keep pace with the rising demand for larger quantities of chemicals.

Observers in Canada report that, despite current investment hurdles, U.S. money and know-how will play a prominent role in the stepped-up development. U.S. chemical interests are already exploring the possibilities of heavy investments. Barring severe new Canadian restrictions against U.S. exports and investments, development of the Northwest Territories should provide profitable opportunities for U.S. chemical process companies.

LEGAL

Offshore Semantics: The state-federal battle over ownership of the submerged lands in the Gulf of Mexico now appears to be one chiefly of definitions.

The crux of the problem now appears to lie in a legal distinction: the distinction between claiming absolute sovereignty over an area and merely claiming the right to use resources.

In their latest move, the states of Texas, Louisiana, Mississippi and Florida told the U.S. Supreme Court that they were entitled to the natural resources in the Gulf to a point three marine leagues (about 10½ miles) from their shores. The states and Alabama are defendants in a suit filed by the Justice Dept.

The defendants maintain that the Submerged Lands Act of 1953 gives them mineral rights 10½ miles out, regardless of their state boundaries. Justice says no and insists that the states should be limited to oil and mineral rights within their sovereign boundaries.

The U.S. has always held that no nation has sovereignty beyond three miles, but this limit doesn't apply to the right to exploit resources.

Briefs will be filed by both sides this year, and oral arguments are expected during the court's second term beginning in October.

•

Fluoridation Suit Fails: After a lengthy fight, Frederick B. Exner, Seattle, Wash., radiologist, has failed to convince the court that fluoridation of drinking water is harmful.

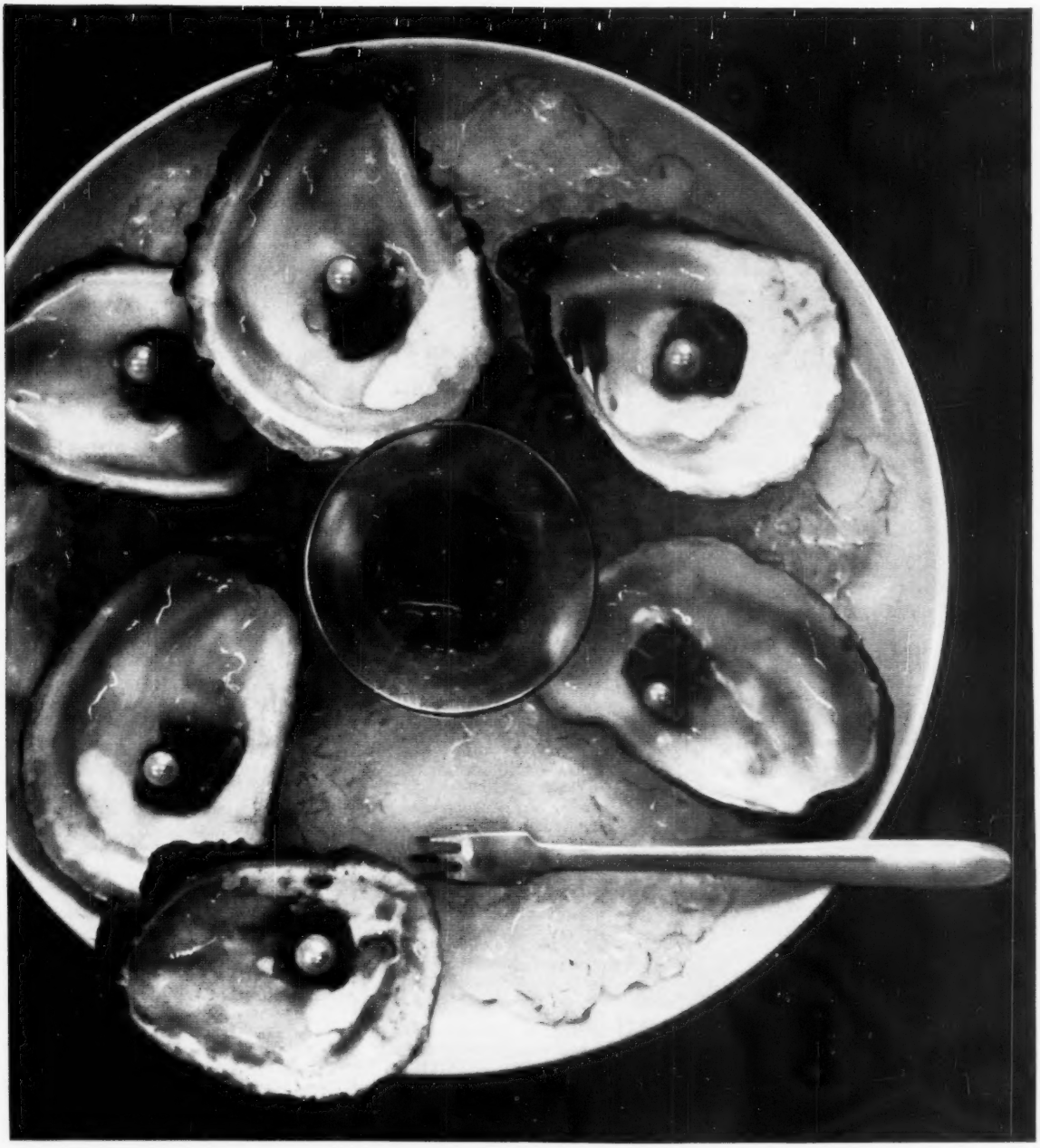
Washington state supreme court has upheld the action of a county superior court at Chehalis in dismissing a suit brought by Exner against the Chehalis Fluoridation League. The suit was to collect $1,000 that had been offered by the league to anyone who could prove any harmful effects of fluoridation. Exner claimed he had the proof, but the court said he failed beyond reasonable doubt to show it.

LABOR

City Layoff Parley: With layoffs becoming more prevalent in the process industries, firms may soon be finding themselves facing city fathers to explain their plans. It's happening at Esso Standard Oil's Bayonne, N. J., refinery, where plans have been formulated to lay off 800 workers. City commissioners adopted a resolution calling for a conference with Esso's board of directors and asking Esso "to defer any action" until Bayonne can review the situation. The commissioners hope "to convince [Esso] that it would be to its advantage to undertake further programs of investments in Bayonne to enlarge facilities and install additional units."

•

Cargo Still Hot: There may be a long wait facing those who feel that the Interstate Commerce Commission's recent decision holding certain "hot cargo" clauses illegal might bring an end to such practice. Teamsters Union President-elect James Hoffa has instructed his local unions to demand inclusion of the clauses in contracts. Hoffa points out that the union plans to appeal the ruling, and that the locals should make no change in demands until a final decision is made.



CAUSTIC SODA: appetite at work

Your processing calls, at many steps, for the economical elimination of unwanted organic or inorganic compounds. You need, time after time, a chemical "appetite" more voracious, if more disciplined, than a Diamond Jim Brady's. To get it, you probably buy Columbia-Southern caustic soda.

You see, the appetite of our caustic *is* distinctively selective. Columbia-Southern *first* trained caustic's bite to the "oyster fork" refinement required for delicate rayon and cellophane production. And we *first* assured customers that caustic's appetite would be delivered fully whetted, through tankcar construction and unloading innovations now standard throughout the industry. We continue to supply *all* caustic consuming businesses, constantly adding to our diversified experience. It's this background that's reflected in our helpfully pertinent technical service.

So as your appetite for caustic soda grows, why not contract with the producer most in touch with your specific needs? Contact Columbia-Southern today for caustic that puts the bite on your *processing*, not on you.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

DISTRICT OFFICES: Cincinnati • Charlotte • Chicago • Cleveland • Boston • New York St. Louis • Minneapolis • New Orleans • Dallas • Houston • Pittsburgh • Philadelphia San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

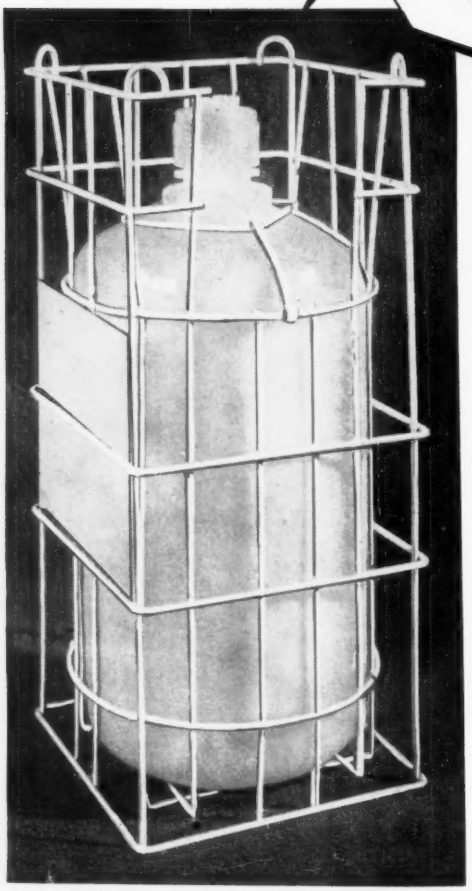
"STEEL-X"

I.C.C. Approved I-H

Carriers

U. S. Pat. #2-330-982
#2-541-972
Reg. Trade Mark #566-791

SHIP AT LESS COST
Savings on freight will soon pay for them. The 13 gallon Steel-X weighs 60% less than the old style glass carboys in wooden crates.



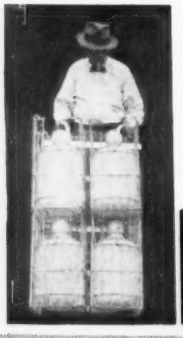
SAVE MONEY on the Distribution of Liquid Chemicals

"STEEL-X" CARRIERS ARE TROUBLE-FREE

There are many reasons why "Steel-X" Carriers will give you the savings so important in today's economy needs. Here are a few of them. The sides of carrier extend well above the top of bottle protecting bottle necks. Secure stacking is realized because of this extension of sides.

A collar which is designed to fit around shoulder of bottle, locks the bottle firmly in the carrier. Steel rod construction provides hand holds making handling easy. Wide mouth bottle permits fast filling and easy pouring without gurgle or splash. An unbreakable puncture resistant Polyethylene bottle used with carrier gives you the most modern package of its kind.

Here is replacement of your hard to handle and bulky boxed carboys:
There are benefits for you all along the line of action.
Four carriers can be loaded on a hand truck and the lightweight load is safely, quickly and easily moved. No spillage in transporting. A cost saving load whether by hand truck, delivery truck or automobile.
Designed for easy handling, filling, shipping, receiving, storage and pouring.



SEE ACTION PICTURES: Film loaned for demonstration. Ask to borrow our 16 mm film which runs for 8 minutes. See the advantages—the benefits—the economy.

USERS OF CHEMICALS should write us direct if their Chemical Supplier does not as yet use this carrier.

WE WILL GLADLY answer all questions and provide Chemical Distributors with complete details upon request.

CARRIER-STEPHENS COMPANY
Containers and chemicals for Industry and Laboratory
P. O. BOX 501 • LANSING 2, MICHIGAN

ALL WIRE CARRIERS ARE NOT "STEEL-X" CARRIERS . . . *THERE'S A DIFFERENCE*

ADMINISTRATION

KEY CHANGES

Henry A. Correa, to vice-president for foreign operations, ACF Industries (New York).

Robert L. Hershey, to director, vice-president and member of the executive committee; and **Walter H. Salzenberg,** to general manager, polychemicals department; Du Pont.

R. Frank Nairn, to vice-president —manufacturing, Congoleum-Nairn (Kearny, N.J.).

Ben C. Belt, to director, Texas Gulf Sulphur Co. (New York).

J. Roy Gordon, to director, Babcock & Wilcox Co. (New York).

Richard J. Hefler, to vice-president —finance, American Potash & Chemical Corp. (Los Angeles).

L. B. Parsons, to director, Lever Brothers Co. (New York).

Stewart E. Ruch, S. R. Bozeman, C. A. Bunde and **Harry Sefton,** to vice-presidents; and **Allen B. Faux,** to treasurer; Pitman-Moore Co., division of Allied Laboratories (Indianapolis).

William J. Weed, to chairman, executive committee, and director; **Joseph E. Sternberg,** to vice-president —operations, and **John W. Hall, Jr.,** to secretary; Mantrose Corp. (Brooklyn, N.Y.).

B. B. Turner, to chief executive officer, Ethyl Corp. (New York).

Joseph E. Rich, to president; **Robert L. Frank,** to vice-president in charge of research; **Garfield King,** to vice-president and treasurer; and **Lloyd M. McBride,** to secretary; Morton Chemical Co., new subsidiary of Morton Salt Co. (Chicago).

R. E. Reitmeier, to president, Catalysts and Chemicals (Louisville, Ky.).

Rolland O. Baum, to executive vice-president and general manager, Tennessee Products & Chemical Corp. (Nashville).

W. L. Stewart, Jr., to board chairman; **Robert T. Collier,** to president; **Homer Reed, William C. Kaesche** and **Robert S. Ray,** to vice-presidents; **Howard W. Wright,** to secretary; and **Frank H. Dlouhy,** to treasurer; all of Collier Carbon and Chemical Corp. (Los Angeles), recently formed by the merger of Brea Chemicals and R. T. Collier Corp.

14 basic chemicals you can BUY FROM

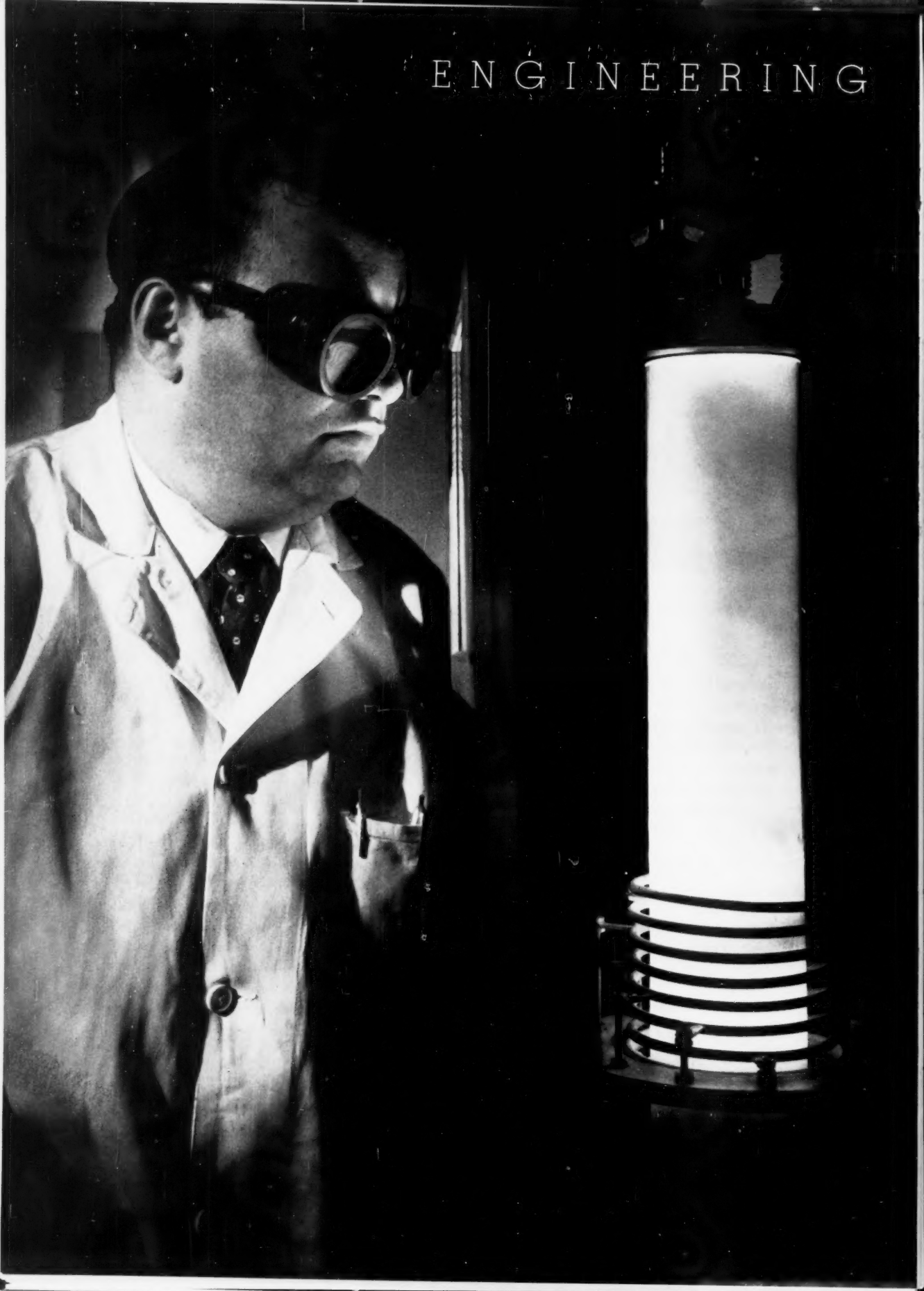
FORMALDEHYDE — An important raw material in the manufacture of resins, adhesives, textiles, leather, rubber and numerous other products. It is marketed by RCI in five different concentrations. *GLYCERINE — Used in the manufacture of synthetic resins, pharmaceuticals, cosmetics, food products and as a humectant. *HYDROCHLORIC ACID — Has wide application in the chemical industry for pickling and cleaning metals, processing textiles, refining ores and in the manufacture of chemicals generally. MALEIC ANHYDRIDE — Principally used in the manufacture of synthetic resins, polyesters, synthetic drying oils, and related products. Its highly reactive structure lends to the synthesis of complex organic chemicals by the Diels-Alder Process. METHANOL — A widely used solvent and chemical intermediate for the manufacture of formaldehyde, rocket fuels, amines and esters. ORTHO-PHENYLPHENOL — A very effective fungicide and bactericide used in many industrial applications for outstanding preservation. PENTACHLORO-PHENOL — Used in various fungicides, bactericides, algicides and herbicides; in agriculture, lumber, pulp and paper applications. SODIUM PENTACHLOROPHENOL — The H_2O soluble salt of penta used to prevent microbiological attack on many organic substances such as wood, adhesives, protein materials. PENTAERYTHRITOL — Used primarily in the manufacture of alkyd resins. Imparts better film properties such as high gloss and gloss retention, good durability, faster drying. Used also in ester gums and synthetic drying aids. PHENOL — A building block in the plastics industry. Also widely used in the intermediates required for the production of synthetic detergents, lubricating oil additives, insecticides, bactericides and pharmaceuticals. PHTHALIC ANHYDRIDE — Used extensively in the manufacture of alkyd resins, plasticizers, organic pigments and dyestuffs, and pharmaceuticals, as well as other fine chemical intermediates. *SEBACIC ACID — Sebacic acid esters are finding increased usage as plasticizers for PVC systems and as safe, non-flammable jet engine lubricants. SODIUM SULFITE — Primarily used by the paper industry in the manufacture of kraft paper and fiber board by the semi-chemical hard wood process. *SULFURIC ACID — A basic commodity used in the paper, dye and pigment, textile, fertilizer and organic chemical industries.

**Production for 1958 committed.*

REICHHOLD RCI *Creative Chemistry... Your Partner in Progress*

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

ENGINEERING



Single crystal of ultrapure silicon emerges from high-frequency heater (left) under scrutiny of Merck staffer.

Searching for High-Purity Silicon

Metal processing experts this week are sifting the process secrets from the raft of rumors attending the entry of two more producers of high-purity silicon. Here's the currently available information about old and new processes, including that on the plans of the new entrants.

Both of the new producers will employ European processes—Merck & Co., Inc. (Rahway, N.J.), by special license agreement with the West German firms of Siemens & Halske and Siemens-Schuckertwerke (*CW Technology Newsletter, Sept. 7, '57*), and W. R. Grace & Co. (New York), by a joint venture with the French firm of Pechiney.

Merck's plans call for commercial production of silicon via the Siemens process, which gives silicon with a boron content of about one part in 6 billion. The complete installation of Merck's new process will require a $5-million addition to its Cherokee plant at Danville, Pa. The plant is going into limited production this month, will be expanded gradually during the year. Merck hasn't revealed Cherokee's capacity, says only that it will be in the "thousands of pounds/year range."

Grace's plans to use Pechiney's process involve creation of a new company: International Metalloids, Inc. Grace owns controlling interest in IM, which will have a 20,000-lbs./year plant in operation at Toa Alta, Puerto Rico, by the middle of '58.

News of these plants has still failed to jar loose any word from three other firms thought interested in silicon production (*CW, July 27, '57, p. 34*). Two of these, Kawecki Chemical Co. and Mallinckrodt Chemical Works, now report an indefinite status for their silicon work, while Monsanto Chemical Co. won't comment at all.

Commercial Soon: Still plowing ahead with commercially oriented research efforts are General Electric Co., Philco Corp. and Foote Mineral Co. The first two projects are government-sponsored, while Foote's work has been on a private basis in recent years.

GE is scaling up a silicon tetraiodide purification process for Wright Air Development Command (Dayton, O.). WADC's goal is silicon of 1,000-ohm-cm. resistivity—the purity level of Siemens-process silicon, currently made in this country by Westinghouse Electric Co. for its own use (*CW, Aug. 24, '57, p. 51*) and soon to be commercially made by Merck.

Philco's activities—backed by Army Signal Supply Agency (Philadelphia)—are directed toward commercializing thermal decomposition of silane (SiH_4). It is presently starting pilot operations on the preparation of this hazardous gas, which it will use as a starting point for silicon with 500-ohm-cm. resistivity. Air Force Cambridge Research Center (Bedford, Mass.) is also interested in the silane route, has let a contract to Metal Hydrides Inc. (Beverly, Mass.) to study this process.

Foote's plans call for production of "higher-purity silicon than is now available" by "a method not presently used commercially." This process is probably an iodide route the company is known to have been investigating. Foote has wide experience with iodide processes employed in the purification of other metals. Although the work has been carried on over a period of years, Foote hasn't set a timetable for its expected startup of large-scale production.

Leaders Still on the Move: All the commotion among firms ready or almost ready to make their entry isn't noticeably bothering those already on the scene: Du Pont, Sylvania Electric, Texas Instruments, and Eagle-Picher (*see table on p. 58*). Du Pont, whose Newport, Del., plant was the first source of commercial silicon, is readying a 50,000-lbs./year plant* at Brevard, N.C., to begin production around March or April '58.

Texas Instruments, too, will shortly undertake an expansion of its production facilities. And Sylvania hopes to improve quality control of its production operations by using a chemical analysis method for boron in place of the conventional—and, admittedly, inadequate—resistivity measurement. It's shooting at a sensitivity on the order of one part boron in 10 billion, says that the chemical technique has attained this sensitivity in lab tests. Eagle-Picher, in addition to its production work, is carrying on active research, including special studies for Air Force Cambridge Research Center.

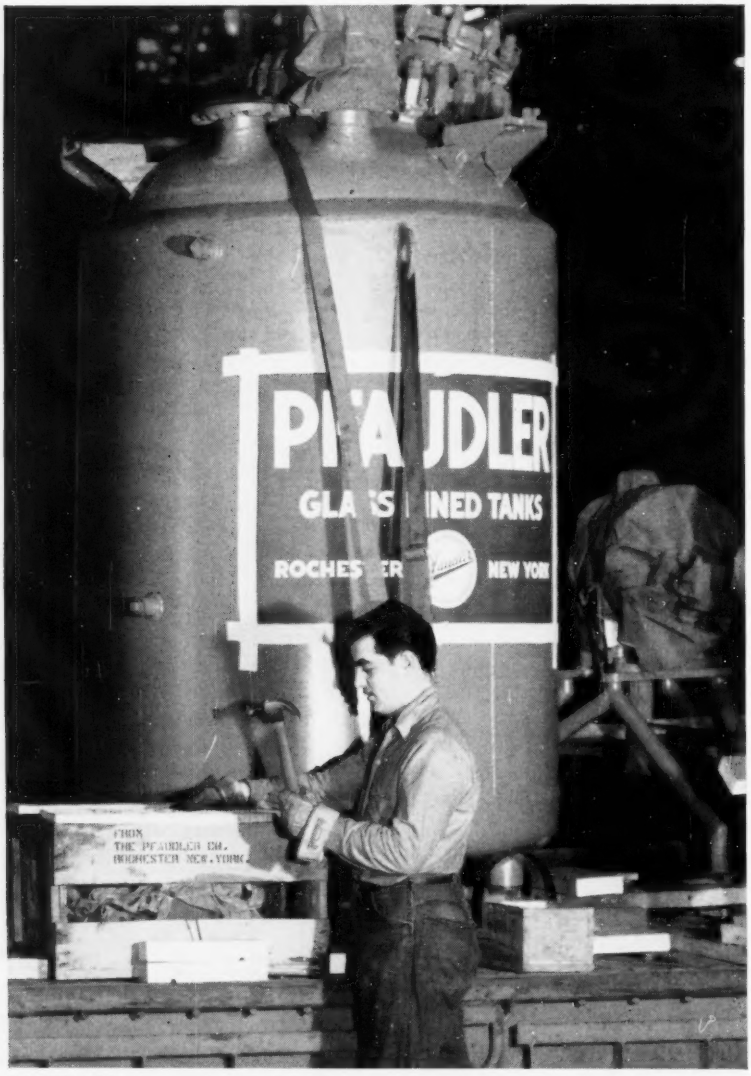
High-Purity Bonus: The newcomers are entering the field prepared to match or top all product purity standards, however. Merck will be the only commercial producer of the 1,000-ohm-cm.-grade silicon. The high purity of this product, it feels, will make possible rectifiers with higher power ratings and higher breakdown voltages, as well as higher-power transistors. And Westinghouse cites another advantage for the product:

*The same plant will also produce 20,000 lbs./year of lower-purity silicon, suitable for use in solar batteries.

Titan Superjectors—continuous-type centrifuges—operate as long as a month without shutdown for cleaning. ASK FOR BULLETIN 946.

Pfaudler

Pfaudler Corrosioneering News Published by The Pfaudler Co., Rochester, N.Y.



READY TO GO. A standard 500-gallon reactor is readied for quick shipment to Gamma Chemical. This vessel was on its way to Gamma's Great Meadows plant even before a written order had arrived! Stock standard reactors usually enable Pfaudler to meet 10 day delivery schedule.

Emergency at Gamma Chemical met by 3-day delivery of 500-gallon reactor

When extra processing capacity was urgently needed recently at Gamma's Great Meadows plant in New Jersey to custom-process a new organic chemical, Gamma called Pfaudler and asked how fast a 500-gallon reactor could be shipped.

"How about the day after tomorrow," countered Pfaudler. "Sold!" said Gamma. Waiving the normal ten-day delivery schedule, Pfaudler rushed a standard unit through the shop even before the customer's written order arrived. The emergency was met—a 500-gallon glassed steel reactor was shipped — in just *three days' time!*

Gamma Chemical's plight points up one of the ways you can benefit from Pfaudler's policy of stocking standard glassed steel reactors. Fast delivery is only one of the savings, however. You can also cut initial costs by eliminating special engineering drawings, special parts, and material custom units require.

You get a versatile, corrosion-resistant reactor whenever you specify a standard Pfaudler glassed steel vessel—resistant to all acids (except HF) and alkaline solutions up to pH 12 at 212° F. Each reactor is completely assembled and ready to ship within two weeks from receipt of your order.

Take advantage of Gamma Chemical's experience and check with Pfaudler before you buy your next reactor. Contact your Pfaudler representative for more information on standard reactors. Units stocked for ten-day delivery include the following capacities: 30, 50, 100, 200, 300, 500, 750, 1000 and 2000 gallons. Check the coupon for sizes in which you are interested.

Rotary seal, stuffing box interchangeable on all Pfaudler reactors*

The question of when to use a mechanical rotary seal *versus* a stuffing box can resolve itself simply to this:

For a wide range of operating conditions with minimum maintenance —the use of a seal is recommended.

In most normal service of low temperature and pressure, the stuffing box is initially more economical. However, as the service becomes more severe, the rotary seal is superior to the stuffing box on all four of the following points:

1. Chemical conditions. The seal performs better in processes which require freedom from lubricant contamination, from yapor loss, and from contact with metal.

2. Pressure. When pressure ranges from 100 to 300 psi, the seal is normally required. (Special designs are rated up to 1500 psi.)

3. Temperature. Stuffing boxes tend to leak considerably above 350° F. By running coolant through the housing of a rotary seal, you can operate at temperatures tolerable in Pfaudler reactors.

4. Agitator speed. Although this is less critical than other conditions, the seal is usually recommended when agitator speeds exceed 150 rpm.

Corrosioneering News

Quick facts about services and equipment available to help you reduce corrosion and processing costs.

To give you flexibility of operation, Pfaudler agitators are designed to use *either* seal *or* stuffing box on the *same* shaft. The shaft sleeve (upper right in above photo) is the interchangeable element. With a Hastelloy sleeve you use a stuffing box. Simply replace it with a "glassed" sleeve and you are ready for a seal. On 3" diameter agitator shafts and larger, you can make the changeover in your plant.

If you would like to study this question more thoroughly, there's considerable factual information in our Bulletin No. 938. Check coupon for copy.

*When specified at time of purchase.

One source for your complete project

Equipment for absorption, adsorption, centrifugation, crystallization, distillation, drying, evaporating, liquid extraction, filtration, heat transfer, and mixing is often interrelated in the making of a single product. In meeting such requirements, we've found a substantial demand for our project engineering services.

Many of our engineers have had long experience in many of these unit operations so that they are *qualified as a group* to help you set up a completely new or revamp an existing project with a minimum of time, manpower and money.

With this service, you can take advantage of this five-point program:

1. Complete project engineering and selection of proper materials of construction.

2. Corrosioneered equipment design.

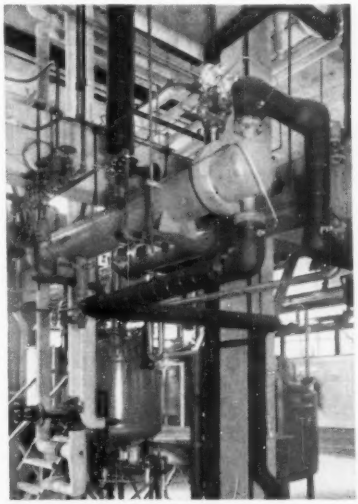
3. Certified fabrication and delivery as required.

4. Start-up and instruction of your personnel.

5. Continued interest in servicing your equipment over the years.

We've completed numerous projects for such varied processes as sulfonation, polymerization, pharmaceutical manufacturing, making resins, solvent recovery, etc. The list is growing daily, so you will find Pfaudler engineers who are experienced and reliable in your field of specialization.

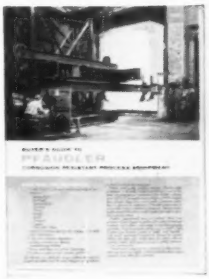
The next time you are programming a new or revamped project, consult with Pfaudler.



Typical of Pfaudler *project-engineered* installations is this distillation assembly for pharmaceutical extractions.

Now available 1958 BUYER'S GUIDE

on corrosion-resistant process equipment



Bulletin 947 is a well-illustrated capsule of the complete line of Pfaudler equipment and services ready to help you fight the never-ending battle against corrosion.

For example, are you aware of the wide range of materials of construction available to you in Pfaudler equipment? Glassed steel, clad and stainless steels, certainly—but do you know the list also includes Hastelloy, nickel, Inconel, titanium, copper and zirconium among others?

Pfaudler reactors, columns and heat exchangers are commonplace, but do you know that we make such other equipment as wiped-film evaporators, desludging centrifuges, vacuum dryer-blenders, and piston fillers?

In case you're in question on the services, products, and technical aids supplied by Pfaudler—and we add to the list every year—send for a copy of Bulletin 947. The coupon makes it easy.

THE PFAUDLER CO., DEPT. CW-18, ROCHESTER 3, NEW YORK

Please send me information on standard reactors (check size) ☐ 30, ☐ 50, ☐ 100, ☐ 200, ☐ 300, ☐ 500, ☐ 750, ☐ 1000, ☐ 2000; ☐ Rotary seals and stuffing boxes, Bulletin 938; ☐ Buyer's Guide, Bulletin 947.

Name .....

Title .....

Company .....

Address .....

City ..... Zone ..... State .....

ENGINEERING MATERIALS HANDBOOK

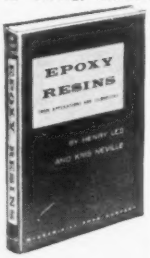
Just Published! Gives answers to both routine and specialized questions regarding the choice of engineering materials. Considers materials from the viewpoint of engineering structures, machinery, and equipment, and includes technical tables, design information, structural characteristics, etc. **Ed. by Charles L. Mantell, Consulting Eng.: Newark College of Engrg. 1906 pp., 648 illus., $21.50**

MANAGEMENT FOR ENGINEERS

Just Published! Provides the engineer with the know-how for undertaking management relations and responsibilities. Chapters discuss production costs and their control; the basic financial transactions of a business enterprise—insurance, depreciation, taxes, power, labor, materials, etc; and the higher level decision-making process. **By Roger C. Heimer, Villanova Univ. 453 pp., $6.75**

EPOXY RESINS

Just Published! Covers the whole range of information needed to make effective industrial use of epoxy resins. Applications, covered against a background of chemistry and technology of the resins and their reactions in curing, include coatings, adhesives, potting compounds, sealants, plastic pipe, etc. **By Henry Lee and Kris Neville, The Epoxylite Corp. 305 pp. 176 illus. $8.00**



MAINTENANCE ENGINEERING HANDBOOK

In this book **scores of experts** give you all the methods, and techniques you need for better plant maintenance for lower production costs, higher profits, and improved product quality. From organization and administration of maintenance forces to sanitation, welding, and corrosion control you have the complete detailed picture. **Edited by L. C. Morrow, Chairman, Nat'l Plant Maint. & Engr. Conf. 1536 pp., 728 illus., $20.00**

SEE THESE BOOKS 10 DAYS FREE

McGraw-Hill Book Co., Dept. CN-1-18
327 W. 41st St., N.Y.C. 36

Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep plus few cents for delivery costs, and return unwanted book(s) postpaid. (We pay delivery costs if you remit with this coupon—same return privilege.)

☐ Mantell—**Engrg. Mat'ls. Hdbk.**, $21.50
☐ Heimer—**Mgt. for Engineers**, $6.75
☐ Lee & Neville—**Epoxy Resins**, $8.00
☐ Morrow—**Maint. Engrg. Hdbk.**, $20.00

(PRINT)
Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position .....

For price and terms outside U. S. write McGraw-Hill Int'l, N.Y.C.

CN-1-18

Silicon Supply Update

Producer	Plant Location (startup)	Price ($/lb.)	Boron level (parts per billion)	Resistivity (ohm-cm.) p-type	n-type
Du Pont	Newport, Del. (1951) and Brevard, N.C. (1958)	360	3	100	25
		250	6	50	15
		160	11	25	5
Sylvania	Towanda, Pa. (1956)	359	not yet specified	100	40
		250	not yet specified	40	15
Texas Instruments	Dallas, Tex. (1956)	750	1*	200	
		400	3*	100	
		240	5*	10	10
Eagle-Picher	Miami, Okla. (1957)	360	2	100	40
		250	6	40	15
Merck	Danville, Pa. (1958)	quoted to customers	1 per 6 billion	>1,000	
International Metalloids	Toa Alta, P. R. (1958)	360	not yet specified	100	

*Total impurities; boron level below 1 ppb

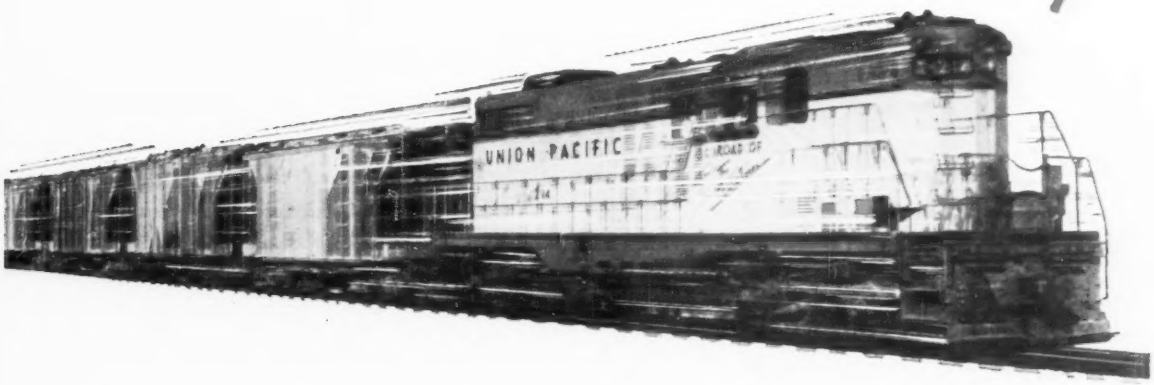
it can be bonded by conventional alloying techniques. The presently available 100-ohm-cm. material must be bonded by diffusion methods that have adverse effects on power transistors made from this material. Although its product will be similar to others already available, International Metalloids should have some special advantages. Given by Grace as points favoring location in Puerto Rico were (1) a plentiful labor supply, (2) a pure atmosphere and (3) a large supply of electric power. Additional advantages include the low labor cost in Puerto Rico and the special tax incentives offered by the government.

Boron Removal—Key Step: Most jealously guarded secret of each producer is how it reduces the boron level. The general pattern is fairly clear, though. Boron is removed from a compound of silicon (e.g., silane, halogenated silane) by chemical means, probably involving complexing of the boron impurity, followed by distillation.

Two research efforts demonstrate that other boron removal methods are possible, although neither is currently used commercially. One is the Bell Telephone Lab technique in which silicon is refined by the floating zone method in a water-vapor atmosphere (*CW, Aug. 24, '57, p. 51*). Because it is almost equally soluble in molten and solid silicon, boron cannot be efficiently removed by standard techniques for zone refining. The Bell innovation provides a chemical means of removing the boron by introduction of water vapor. The water ionizes at the high temperatures used; the boron reacts with the oxygen formed. Silicon with a resistivity in the order of 10,000 ohm-cm. (corresponding to only a few parts of boron per 100 billion) has been prepared by this method.

Air Force Cambridge Research Center has also achieved a similarly low boron level through the use of zone refining. However, its technique is distinguished by the fact that it treats silicon tetraiodide instead of elemental silicon. The key step is a zone purification of tetraiodide that has been partly purified by crystalli-

you say *when and how many*



Westvaco® Soda Ash is "delivered as promised" by America's largest hopper-car fleet!

Around the clock and around the calendar, some 300 Westvaco Soda Ash covered hopper-cars are in regular customer service. That's by far the largest fleet of modern cars in the industry. It's one more good reason why you'll be happy with Westvaco Soda Ash.

Other reasons?

Product quality—chemical and physical. Shipping specs held consistently between 99.75% and 99.88% so you get more Na_2CO_3 per gross ton. Low iron and other impurities that might discolor solids, mixtures or solutions. Fewer fines, less dusting. Free flowing for faster unloading and handling.

Increasing plant efficiency continues to make more Westvaco Soda Ash available for more users in our shipping area covering two-thirds of the United States. It's quite probable you can get premium quality Westvaco Soda Ash without paying one penny more.

Why not get our quotation on a fair share of your needs?

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Westvaco Chlor-Alkali Division

General Sales Offices:
161 E. 42nd STREET, NEW YORK 17

Du Pont Methylamines

can help in your development work

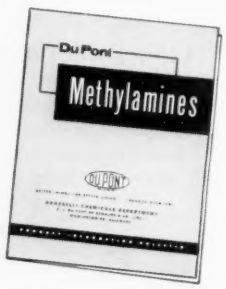
If you're interested in these end-uses or applications...

Animal nutrients	Herbicides	Rubber chemicals
Coatings	Insecticides	Solvents
Drugs and pharmaceuticals	Leather	Ion exchange resins
Dyes	Photographic developers	Surface active agents
Fungicides	Rocket fuel	Quaternary ammonium salts

WRITE FOR THIS INFORMATIVE BULLETIN...

This recent booklet reviews the properties and chemical reactions obtainable with Du Pont Mono-, Di-, and Trimethylamines . . . discusses uses and lists references for further study by development personnel.

Du Pont Methylamines are readily available as compressed gases in lightweight, easy-to-handle cylinders and tank cars, and as aqueous solutions in drums and tank cars. Their purity minimizes undesirable side reactions. They are low in cost, noncorrosive to steel and are very soluble in water.



For your free copy of the booklet just write to:

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Department, Room N-2533
Wilmington 98, Delaware

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

zation from toluene and sublimation. Boron impurities have a segregation factor of 0.16 in the tetraiodide as opposed to 0.9 in silicon.† The expense of the zone-refining step however, makes it unattractive on an economic basis.

GE is currently trying to produce 1,000-ohm-cm. silicon by crystallizing the tetraiodide from heptane and refining it by fractional distillation.

Once the tetraiodide is purified to the desired boron level, it is a relatively conventional step to silicon. The iodide is decomposed by heating in a vacuum; high-purity silicon is then crystallized on an inductively heated silicon bar. Eagle-Picher's research contract covers work on this step.

Various Routes Practiced: There's a greater willingness to talk about silicon processes when the subject is not limited to boron purification. For instance, Du Pont's process involves a zinc reduction of silicon tetrachloride. Purified silicon crystals are grown on the walls of the quartz reaction vessel, which is heated to about 1000 C. Du Pont currently does not supply zone-refined silicon (nor do other present producers). But it does not rule out the possibility that it might add a zone-refining step at its new plant, if it's demanded by customers.

R. S. Aries & Associates (Stamford, Conn.) has outlined a silicon production method (*CW Technology Newsletter, Aug. 10, '57*), in use outside the U.S., that employs a sodium reduction of the tetrachloride.

Most other producers prefer not to comment on any part of their method, although Texas Instruments does describe its reduction step as a thermal decomposition. Eagle-Picher conducted research for the Signal Corps on silane distillation and decomposition in a hydrogen atmosphere, is reportedly using a variation of this method with silicochloroform ($SiHCl_3$).

The Siemens process is also believed to involve hydrogen-atmosphere reduction of silicochloroform. Secret of the high purity of its product is a chemical boron-removal step prior to the hydrogen-atmosphere reduction. Siemens reportedly also has patents on a route involving thermal decomposition of silane.

Pechiney has patents on silicon proc-

†The segregation factor is the ratio of an impurity's solubility in a solid compound to its solubility in the liquid form of the same compound.

Blaw-Knox designs for Goodyear...

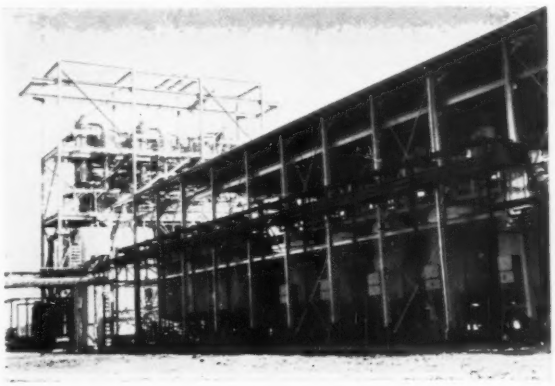
mammoth expansion creates the world's largest synthetic rubber plant

Designed by Blaw-Knox, this $10 million expansion boosts capacity at Goodyear's Houston synthetic rubber plant to 220,000 long tons a year. With this 50% increase in output, this plant becomes the world's largest single producer of dry type synthetic rubber.

Goodyear and Blaw-Knox have been doing big things together for over fifteen years—from Goodyear's first monomer purification facilities to the current construction of the first synthetic rubber plant in Great Britain.*

Repeat business in many diversified fields occurs regularly at Blaw-Knox. But this kind of *continuous endorsement* is not easily earned. It takes solid engineering skill and broad technical experience to assure results that win future assignments.

To see how this endorsed know-how can help you with your plans for erection, expansion or modernization of your plant, contact Blaw-Knox.



Two lines of reactors—each containing 11-5,000 gallon reactors along with three stripping columns form the heart of new plant expansion.

*A facility owned in part by Goodyear Tire & Rubber Co. (Great Britain), Ltd.

BLAW-KNOX

BLAW-KNOX COMPANY

Chemical Plants Division • Pittsburgh 22, Pa. • Chicago 1, Ill.

Birmingham • New York • Haddon Heights, N.J. • San Francisco • Washington, D.C.

Why did we send this drum of caustic on a winter cruise?

This is our way of reminding you that the caustic that flows *best* in the summer is, of course, the caustic you should use in the winter, too.

If you're one of the many who were prudent enough to use Wyandotte Flo-chilled Anhydrous Caustic Soda last summer — you know what we mean. *It's free-flowing always.*

Call your Wyandotte representative or distributor NOW. It costs no more than ordinary caustic.

Look for this label . . . and be SURE!

Wyandotte CHEMICALS

MICHIGAN ALKALI DIVISION

WYANDOTTE CHEMICALS CORPORATION, WYANDOTTE, MICHIGAN • Offices in Principal Cities

esses, at least one of which is said to be a halide purification and decomposition.

Research in Silicon Carbide: A companion product, silicon carbide, would not only widen the useful range of transistors but also might use quantities of high-purity silicon in its preparation. Maximum temperature at which a silicon transistor can be operated without damaging some of its characteristics is around 175-200 C (giving Si an advantage over germanium, which drops in efficiency around 75-85 C). However, devices made with silicon carbide have been made to operate as high as 700 C in at least two labs: at AFCRC (*CW Technology Newsletter, Dec. 28, '57*) and at GE.

Purity is as important in the carbide as it is in silicon itself. AFCRC is presently obtaining its material in two ways. Sublimation (at 2500 C) of commercially obtainable silicon carbide is one method. The vaporized material diffuses through a graphite wall, crystallizes on the other side of the wall. The extremely high purity levels desirable in semiconductor work are difficult, if not impossible, to reach by this method, however. An alternate route used by AFCRC requires an intimate stoichiometric mixture of high-purity silicon and carbon as the starting materials. Vapor diffusion of this mixture also results in the formation of silicon carbide crystals.

GE's independent work at Syracuse parallels the Air Force's methods and results. Its choice of process: vapor diffusion of the silicon-carbon mixture.

Westinghouse, which is doing contract work with AFCRC, has another approach in making the carbide. Since even the purest carbon (reactor-grade graphite) doesn't match the purity attainable in silicon, Westinghouse breaks down a very-high-purity hydrocarbon, reacts the carbon so obtained with semiconductor-grade silicon.

These groups are by no means alone in the study of silicon carbide as a semiconductor material. Most firms interested in silicon say they are doing research on other compounds, as well as on silicon carbide. Among the other materials: compounds of elements from group 3 (e.g., aluminum, gallium, indium) and group 5 (e.g., phosphorus, arsenic, antimony) of the periodic table.

Using Salt Efficiently

by INTERNATIONAL SALT COMPANY, INC.

Hydraulic Handling—Quick, Economical Way to Move Salt into Storage

Here's a new, effective method for moving salt from delivery cars or trucks into plant storage, without disrupting other operations. Hydraulic Handling systems, already in operation in several plants, have eliminated the expense of mechanical unloading equipment, and cut down considerably on man-hours needed to do the job.

What is Hydraulic Handling? Very simply, Hydraulic Handling is the movement of granular salt in circulating saturated brine, through pipes. Referring to the diagram, you will note that dry salt from the hopper car is mixed with saturated brine in a salt-receiving pit, to form a slurry of the saturated brine and undissolved salt. This slurry is pumped through a pipe to a salt-storage tank. Overflow brine from the tank continuously returns to the slurrying pit to carry more salt into storage.

Advantages of Hydraulic Handling. Every Hydraulic Handling installation has a number of exclusive advantages:

1. **Great flexibility.** Because *pipes* do the work of carrying salt, a Hydraulic Handling system can be installed anywhere in the plant. Piping is flexible, and can be run where it won't interfere with other plant operating activities.

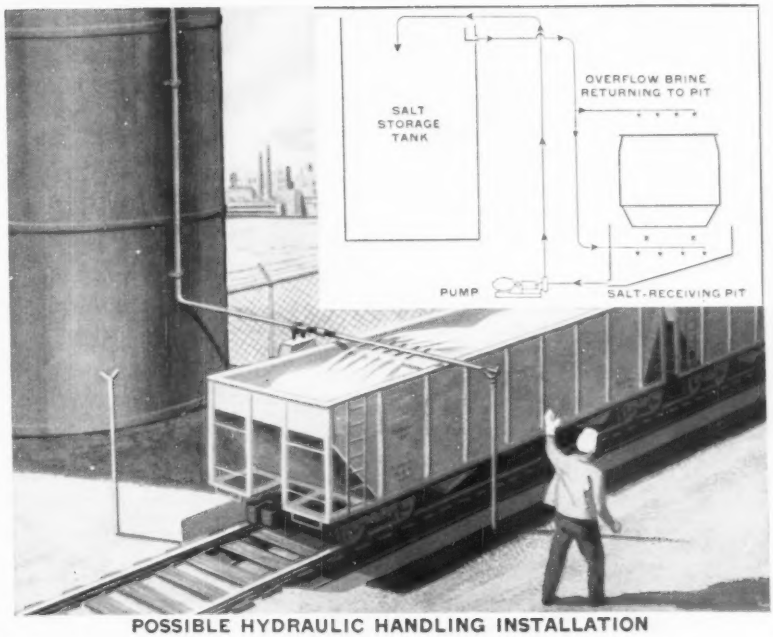
2. **No need to move existing equipment.** Machines that might obstruct mechanical handling equipment simply don't get in the way of a Hydraulic Handling installation.

3. **Long life, low maintenance.** You need no safety guards . . . no roofing to protect salt from weather . . . no belt conveyors, elevators or similar pieces of mechanical handling equipment. Also, there is never any salt dust that might corrode vital plant equipment. As a result, Hydraulic Handling installations have a long life, with very little maintenance expense.

4. **Unlimited capacity.** Hydraulic Handling systems can be designed to unload, move and store any amount and type of salt—rock or evaporated. Whatever your specific unloading needs, Hydraulic Handling can satisfy them.

For rock-salt users, Hydraulic Handling is especially economical when used with combined wet-storage and dissolving tanks or with International Salt Company's famous Sterling Wet-Storage Lixator. These units store Sterling Rock Salt the same way Hydraulic Handling moves it: combined with saturated brine. Thus the salt-and-brine slurry delivered through Hydraulic Handling to the Lixator *is already in the correct form.* The Lixator delivers 100%-saturated Lixate Brine through pipes to any point of use in the plant, and automatically makes more brine as needed.

From delivery to use, dry rock salt is never handled in plants equipped with both a Hydraulic Handling system and a Sterling Lixator.



POSSIBLE HYDRAULIC HANDLING INSTALLATION

You can get more information on how Hydraulic Handling can work in your plant to cut down salt-unloading and salt-handling expense from International Salt Company. One of our experienced Sales Engineers will be glad to work with you to determine the best system of Hydraulic Handling for your specific needs. He can also help you use salt efficiently in *all* your plant operations needing salt or brine.

Behind this qualified salt specialist are all the resources and experience of International Salt Company. We produce both Sterling Rock Salt and Sterling Evaporated Salt in all types and sizes . . . plus automatic equipment for making brine from both kinds of salt. So our sales engineer can recommend the type and size of salt most perfectly suited to your needs. He can also recommend the most efficient and inexpensive methods for storing, handling or using salt or brine. Ask him . . . send a card or letter to International Salt Company, Inc., Scranton 2, Pa. . . . or contact our nearest sales office.

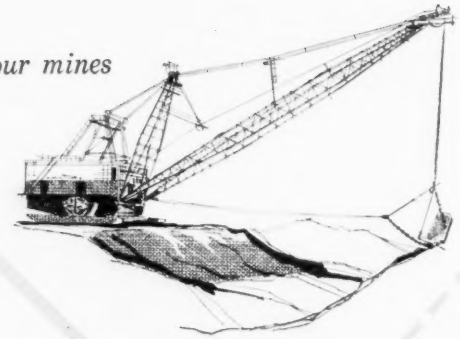
INTERNATIONAL SALT CO., SCRANTON, PA.

Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; Memphis, Tenn; and Richmond, Va.

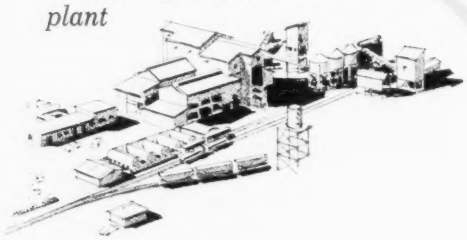
Service and Research are the Extras in **STERLING SALT**

PRODUCT OF INTERNATIONAL SALT COMPANY, INC.

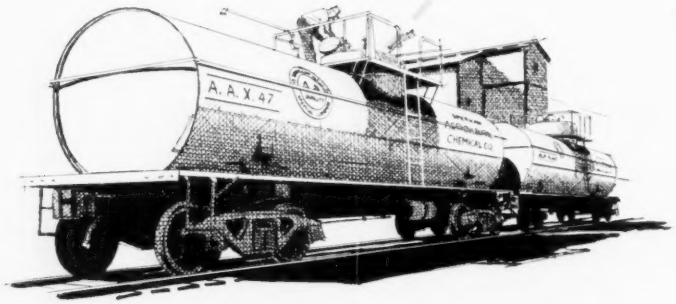
from our mines



to the elemental phosphorus plant



AA Quality Chemicals



to 99.9% pure elemental phosphorus

Whether used in its 99.9% pure elemental form or in the ever-widening range of phosphorus derivatives and compounds, AA QUALITY Elemental Phosphorus assures highest standards of quality and uniformity. *Quality* you can rely on, because of rigid control from mines to finished products. *Service* you can depend on, because of large-scale integrated production and ample phosphate rock reserves.

If our Research Department can be of service to you in problems concerning organic or inorganic phosphates, please write on your company letterhead for information.

AA QUALITY® PHOSPHORUS PRODUCTS

PHOSPHORUS AND PHOSPHORUS COMPOUNDS
Elemental Phosphorus (Yellow-White)
Phosphorus Red (Amorphous)
Phosphorus Pentasulphide • Sesquisulphide
Ferro Phosphorus (Iron Phosphide)

PHOSPHATES
Disodium Phosphate • Trisodium Phosphate
PHOS-FEED® BRAND Dicalcium Phosphate

PHOSPHORIC ACID
85% N.F. Grade • 75% Pure Food Grade
50% Pure Food Grade
Agricultural and Other Grades

PHOSPHATE ROCK & FERTILIZERS
All grades Florida Pebble Phosphate Rock
Superphosphate
Complete Fertilizers
Agrinite®

OTHER AA QUALITY PRODUCTS

FLUORIDES & SILICOFLUORIDES
Sodium Fluoride • Ammonium Silicofluoride
Magnesium Silicofluoride
Potassium Silicofluoride
Sodium Silicofluoride • Zinc Silicofluoride
Silicofluoride Mixtures
Magnesium Fluoride

GELATIN
KEYSTONE® Gelatin: Edible, Photographic, Pharmaceutical, Technical

OTHER PRODUCTS
Animal Bone Charcoal
Bone Black Pigment (COSMIC® BLACKS)
Bone Ash
Bone Oil
Keystone Ammonium Carbonate
Sulphuric Acid

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

Chemical Division: 50 Church Street, New York 7, N. Y. • 33 plants and offices serving U. S., Canada, Cuba

Technology
Newsletter

CHEMICAL WEEK
January 18, 1958

Shell Chemical is pushing forward with its new glycerine synthesis. It will start construction early this year on two new multimillion-dollar plants, one to make acrolein and the other to convert part of the acrolein into glycerine. The scope of the project is indicated by Shell's plans to make glycerine at an original rate of 35 million lbs./year. Location: Norco, La.

The first part of the project, a plant to make hydrogen peroxide by a new process, has been completed, and Shell expects to start marketing some of the product shortly.

Shell has never said very much about the processes involved in the project. But it now seems certain that the earlier suggestions (*CW, March 24, '56, p. 44; May 7, '55, p. 72*) regarding the process are correct. This is how the three processes look:

- Hydrogen peroxide. Shell is undoubtedly making hydrogen peroxide by liquid-phase, air oxidation of isopropanol. An important coproduct of this reaction is acetone. Shell is probably getting close to 50 million lbs. of acetone along with its announced capacity of 30 million lbs. of hydrogen peroxide.

- Acrolein. Propylene will be oxidized to yield acrolein via a direct, catalytic air oxidation. Shell plans to offer some of the acrolein for sale. It also intends to investigate a number of acrolein derivatives.

- Glycerine. A portion of the acrolein will be used to make glycerine. There are several ways this could be done. But the most likely route is to convert the acrolein into allyl alcohol by reacting it with isopropanol. Acetone again would be an important coproduct of this step. In the final step, then, allyl alcohol would be hydroxylated with the hydrogen peroxide into glycerine. Several catalysts can be used in this step. Probably, Shell will use an organic sulfonic acid such as an alkyl aryl sulfonic acid.

Where will the glycerine go? It's no secret that the country's supply of glycerine is ample at the present. So Shell will cut back its production by its present synthesis, which starts with the chlorination of propylene. This step will free allyl chloride made in those facilities for production of epichlorohydrin, epoxy resins, allyl amines and other derivatives. While Shell isn't saying anything about acetone, the new project will undoubtedly relieve the acetone it makes from isopropanol by conventional processing.

The decision to go ahead on building the acrolein and glycerine units at the same time represents a slight change in policy for Shell. Just before construction of the hydrogen peroxide plant got under way, Richard McCurdy, president of Shell Chemical, said the three plants would be dealt with separately. His feeling at that time was that starting up one new plant at a time was headache enough for any firm to bear. Presumably, now that

it has finished the first plant, Shell feels more comfortable about tackling the other two.

•

Acridine dyes provide a new approach in solar batteries that is being probed by Gerald Oster, of Polytechnic Institute of Brooklyn (New York). The dyes, multiring compounds containing nitrogen, store up energy from sunlight, which is released when the dyes are placed in the dark. Oster has found that the dyes, in the presence of a reducing agent, use 25% of the radiant energy they absorb to change into different compounds—energy that's released as the compound reconverts into the dye in the dark.

The discovery was made while Oster was working under an Air Force contract. He's now seeking funds from the Air Force Office of Scientific Research to make application studies. If these prove successful, it could be important to earth satellite projects and to any number of applications involving solar energy.

•

Goodyear's "synthetic natural rubber" may soon go commercial. The firm has just completed a $750,000 pilot plant to make the material, tagged Natsyn, which will permit "tonnage production." And Goodyear says it expects to start engineering soon on a 25-30,000-tons/year plant.

The process involves the polymerization of isoprene with a Ziegler-type catalyst (*CW Technology Newsletter, Nov. 12, '55*). According to Goodyear, Natsyn has the same molecular structure and performance characteristics as natural rubber.

•

"Germ-warfare" against insects is showing promise. That's what F. L. McEwen, Cornell entomologist at the Experiment Station at Geneva, N. Y. (a unit of the State University of New York), reports this week. He has found that at least five virus diseases of insects can be used to secure field control of insects equal to that obtained by chemical means. And in experiments at Geneva, researchers have been able to control the destructive cabbage looper worm—which has successfully withstood attacks from chemicals—by the introduction of a virus. The Geneva tests show that one diseased looper could infect more than a billion healthy worms.

Previously, investigators of the U. S. Dept. of Agriculture and the University of California had uncovered similarly encouraging results (*CW, April 21, '56, p. 80*) with the use of viruses. However, a tremendous amount of research must be done before the method's full worth can be assessed.

•

Ethyl Corp. now has U. S. patents on its new antiknock compound. Two new patents (2,818,416 and 2,818,417) cover the class of compounds—a cyclopentadienyl group attached to a metal that is also attached to other organic and inorganic groups. Also covered is the specific compound, AK-33X (a derivative of cyclopentadienyl manganese carbonyl), that Ethyl is supplying to refiners for evaluation.

HERE'S YOUR

1958 WINTHROP PRICE LIST!

OVER 100 BULK CHEMICALS

INCLUDING

PHARMACEUTICALS such as DIPYRONE, PHENYLEPHRINE

INTERMEDIATES such as DIPHENYLACETONITRILE, MALONONITRILE

PYRAZOLONES such as PHENYL CARBETHOXY PYRAZOLONE, PHENYL METHYL PYRAZOLONE

AMINO ACIDS and other **BIOCHEMICALS**

MANY PURCHASING AGENTS, PRODUCTION MANAGERS AND RESEARCH DIRECTORS HAVE BEEN AMAZED AT THE WEALTH OF CHEMICAL STOCKS AVAILABLE FROM WINTHROP

If you want something *Special* be prepared to reach for this maroon book.
FILL OUT THE COUPON BELOW FOR PROMPT MAILING.

Winthrop Laboratories
Special Chemicals Dept.
1450 Broadway, New York 18, N. Y.

NAME .....

FIRM .....

STREET ADDRESS .....

CITY ..... ZONE ..... STATE .....

Dept. CW-18

THE MAN WITH THE ★ MULTIWALL PLAN

UNION
PACKAGING SPECIALIST
DON DEININGER

saves Multiwall user $8 per M through specifications review

A Chemical Company, already using 43 different sizes and types of Multiwalls, planned to add new products to its line. Union Packaging Specialist Don Deininger recommended a simplification of Multiwall specifications and inventory. Union prepared a Specifications Manual for the manufacturer, also simplified, unified and modernized his bag designs.

Union Multiwall Recommendations are based on this 5-point Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Results: user reported: (1) Union's recommendations for re-designing bag sizes and constructions in some instances saved as much as $8 per M.

(2) The new Specifications book enabled the customer to order bags more easily and accurately. It also simplified his inventory control.

(3) The new designs established a visual relationship between his family of products, enabled his sales force to do a better merchandising job.

This is a typical example of Union's 5-Point Multiwall Plan in action. Perhaps it can produce gains in your own Multiwall packaging operation. Write for additional information.

Better Multiwall performance through better planning

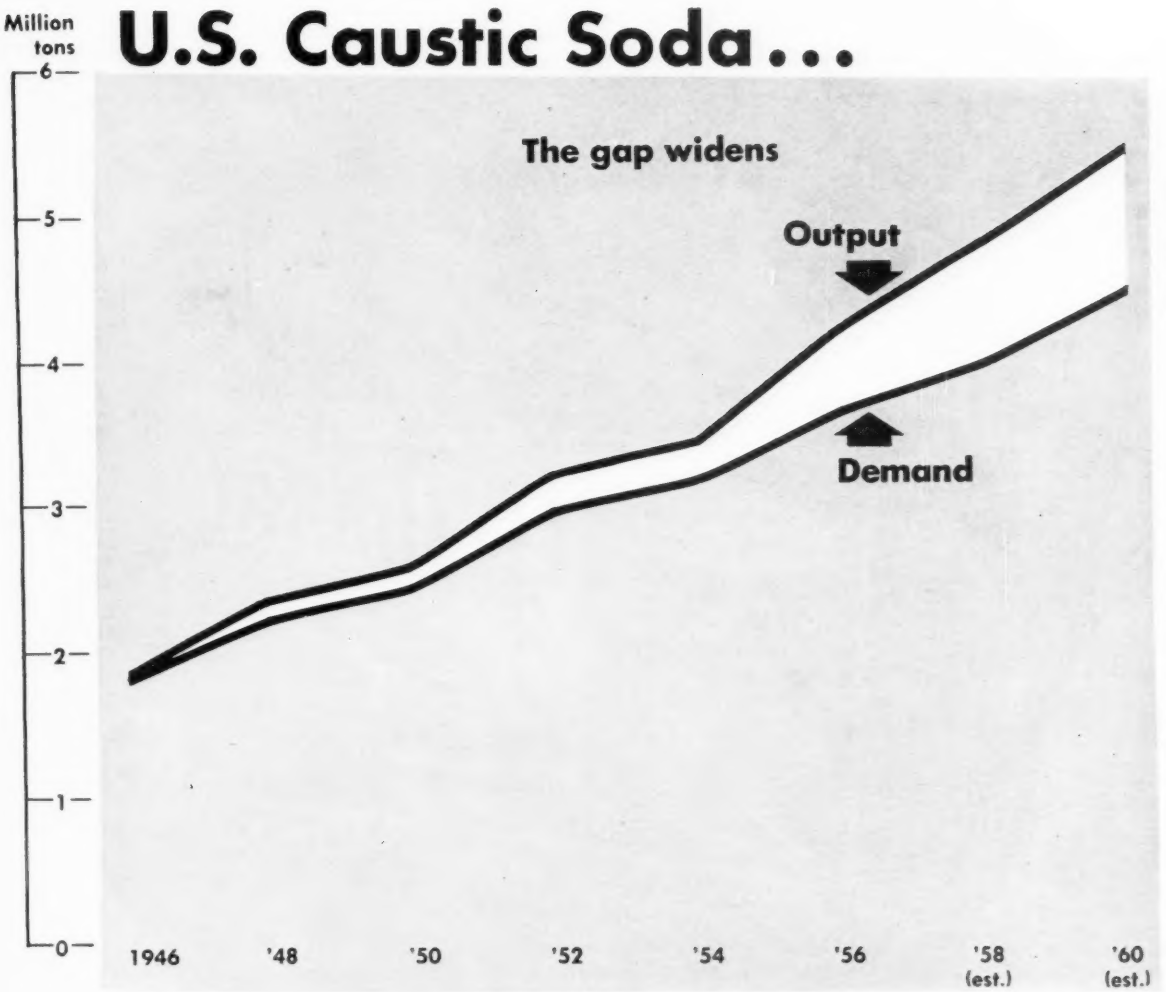
union camp

UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

UNION BAG-CAMP PAPER CORPORATION

233 BROADWAY, NEW YORK 7, N. Y.



Caustic—Plenty for Now and Future

Producers of caustic soda continue to report, officially, this week that demand and output of their product is in good balance. But off the record, they're seriously concerned about the caustic glut that has long plagued the industry.

Their fear is that it won't diminish —particularly if output continues the climb that will put annual production at an estimated 7 millions tons by '65.

The caustic supply situation, of course, is inextricably tied to chlorine production. The bulk of caustic is obtained as by-product in the electrolytic production of chlorine. Prior to World War I, leading method of making sodium hydroxide was the lime-soda process. As demand for chlorine skyrocketed, however, the electrolytic method gained in importance; by the end of '58, an estimated 4.5 million tons/year of caustic—92% of the '58 total—will be made electrolytically.

Just a few years ago, in '50, some 2 million tons of caustic (about 78% of the total) was made electrolytically; lime-soda methods then contributed about 22% of the total.

More Chlorine, More Caustic: Meanwhile, demand for chlorine is expected to move up at a fast clip. Market followers peg chlorine output by '65 at some 7 million tons/year; and it's a safe bet that by '60 production will be at least 4.9 million tons a year. That's more than a doubling of output in a decade. (Chlorine production was at some 2.1 million tons in '50.)

Emphasizing immediate additions to chlorine facilities, the Chlorine Institute reports these chlorine-caustic units are due to come onstream this year:

- Wyandotte Chemicals' new plant at Geismar, La.

WHEREVER YOU ARE...

THERE'S A DISTRIBUTOR

OF DU PONT METHANOL

READY TO SERVE YOU

CALIFORNIA

Los Angeles ..... Braun Corporation
San Francisco ..... Braun-Knecht-Heimann Co.

COLORADO

Denver ..... The Chemical Sales Co.

FLORIDA

Jacksonville ..... Apperson Chemical, Inc.
Miami ..... Biscayne Chemical Labs., Inc.
Orlando ..... Lenfestey Supply Co.
Tampa ..... Lenfestey Supply Co.

GEORGIA

Atlanta ..... Chemical Services, Inc.

ILLINOIS

Chicago ..... Central Solvents & Chemicals Co.
Chicago ..... Phillips & Martin Co.

INDIANA

Ft. Wayne ..... Hoosier Solvents & Chemicals Corp.
Indianapolis .. Hoosier Solvents & Chemicals Corp.

KANSAS

Wichita ..... Barada & Page, Inc.

KENTUCKY

Louisville ..... Dixie Solvents & Chemicals Co.

LOUISIANA

New Orleans
Southern Solvents & Chemicals Corp.

MARYLAND

Baltimore ..... Leidy Chemicals Corp.

MASSACHUSETTS

Boston ..... Howe & French, Inc.

Du Pont chemical experience is the reason...

You can count on prompt delivery of high-quality Du Pont Methanol any time, any place

Du Pont — producer of methanol for 30 years — has set up a nationwide network of distributors equipped to supply your needs.

HERE'S a basic chemical that might be of use in your development or processing work. Methanol is one of the most versatile and reactive of all alcohols — can be oxidized to formaldehyde, decomposed to provide a source of hydrogen and carbon monoxide, or used as a solvent. Whatever the application, you can rely on Du Pont Methanol to meet your most exacting specifications — it's a product with over 3 decades of successful industrial use.

To keep pace with the growing demand for this basic chemical, Du Pont Polychemicals Department works closely with a group of suppliers strategically located throughout the country. These Du Pont Distributors are aware of your local transportation problems, have the equipment, the manpower to assure deliveries timed to meet your schedules.

Your local distributor can guarantee highest purity and uniformity in the quantities you need — drums, tank trucks or tank cars. And Du Pont Technical Representatives are always available for assistance through any distributor listed below.

FORMULA:

CH_3OH

SPECIFICATIONS:

Purity Exceeds	99.85%
Distillation Range*	1.0°C. Maximum
Non-volatile Content	0.001% Maximum
Acetone Content	0.003% Maximum
Acidity or Alkalinity	0.003% Maximum
Color A.P.H.A.	5 Maximum
Odor	Free from foreign odor
Permanganate Test	30 Mins. Minimum

*ASTM Method D-268

(All percentages on weight basis)

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

POLYCHEMICALS DEPARTMENT

MICHIGAN
Detroit — Western Solvents & Chemicals Co.
Grand Rapids — Wolverine Solvents & Chemicals Co.

MINNESOTA
St. Paul — Lyon Chemicals, Inc.

MISSOURI
Kansas City — Barada & Page, Inc.
Kansas City — Missouri Solvents & Chemicals Co.
St. Louis — Missouri Solvents & Chemicals Co.

METROPOLITAN NEW YORK
Lyndhurst, N. J. — Stoney-Mueller, Inc.

NEW JERSEY
Lyndhurst — Stoney-Mueller, Inc.

NEW YORK
Binghamton — Collier Chemicals, Inc.
Buffalo — Chemical Sales Corp.
New York — Stoney-Mueller, Inc.
Rensselaer — Eastern Chemicals, Inc.
Rochester — Chemical Sales Corp.

NORTH CAROLINA
Durham — Cardinal Products, Inc.

OHIO
Cincinnati — Amsco Solvents & Chemicals Co.
Cleveland — Ohio Solvents & Chemicals Co.
Toledo — Toledo Solvents & Chemicals Co.

OKLAHOMA
Tulsa — Ward Chemical & Supply Co.

OREGON
Portland — Van Waters & Rogers, Inc.

PENNSYLVANIA
Pittsburgh — Vitro Manufacturing Co.

TENNESSEE
Memphis — Chapman Chemical Co.

TEXAS
Dallas — Texas Solvents & Chemicals Co.
Dallas — Van Waters & Rogers, Inc.
Houston — Texas Solvents & Chemicals Co.
Houston — Van Waters & Rogers, Inc.

UTAH
Salt Lake City — Braun-Knecht-Heimann Co.
Salt Lake City — Wasatch Chemical Co.

WASHINGTON
Seattle — Van Waters & Rogers, Inc.
Spokane — Van Waters & Rogers, Inc.

WISCONSIN
Milwaukee — Wisconsin Solvents & Chemicals Corp.

FLATTING
THICKENING
SUSPENSION
LUBRICATING
WATERPROOFING
PRESERVING
HARDENING
BLEED PREVENTION
QUENCHING

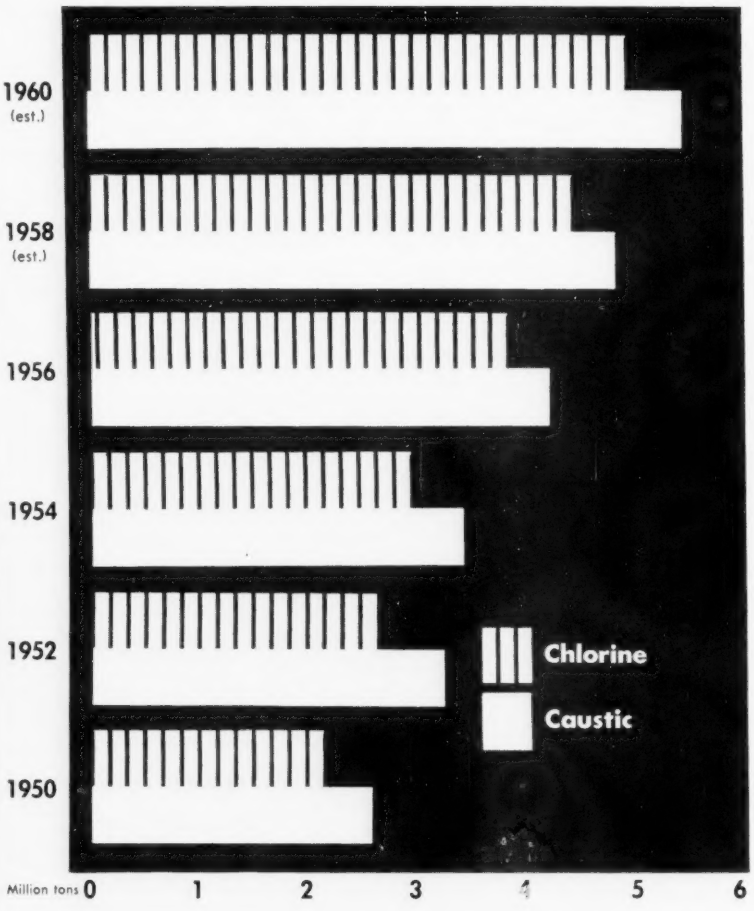
METASAP STEARATES CAN HELP YOU DO THESE JOBS BETTER

Write Today

METASAP CHEMICAL COMPANY
A NOPCO Subsidiary
HARRISON, N. J.
Chicago, Ill. • Boston, Mass.
Cedartown, Ga. • Richmond, Cal.
London, Canada

THE CLEANEST STEARATES MADE!

More chlorine means more caustic



• Frontier Chemical's expanded plant at Wichita, Kan.

• Dow Chemical's new facilities at Plaquemine, La.

• Diamond Alkali's expanded Houston, Tex., plant.

• Columbia-Southern's expanded New Martinsville, W. Va., unit.

• Jefferson Chemical's new plant at Port Neches, Tex., onstream by '59.

All these expansions mean that considerably more caustic soda will be available. And, in turn, there's a good chance that the caustic soda oversupply situation will worsen.

Demand vs. Supply: Chlorine-caustic producers have neat tabulations that indicate a well-balanced supply-and-demand situation. The balanced ledger for chlorine seems reasonable —not only for past years but also in forecasts. Propelled by growing chemical needs, as well as growing demands of the pulp and paper industry (chlorine's two biggest consumers), chlorine future demand will move briskly, keeping close pace with production. (Production, by the end of this year, is expected to hit some 4.4 million tons—an impressive 110% jump over '50's 2.1 million tons.)

Producers officially present a similarly rosy production-demand picture for caustic soda. But closer inspection turns up some smudges. Demand for caustic has been growing all along, but it hasn't kept pace with production. By the end of '58, there may be as much as 800,000 tons more caustic soda around than can be consumed—a good 16% of estimated '58 output.

As a matter of fact, caustic supply and demand haven't been in balance since '48. In '56, output was 4.2 million tons, and demand was closer to 3.7 million tons. The gap has widened so steadily that some trade followers

BRIEFS for buyers of

Caustic Soda

Phosphorus Compounds

Other Chemicals

Chemicals for a growth area

Pulp, petroleum, and plywood are three of the main reasons why industry is popping in western Canada.

Fitting neatly into this growth picture is the new plant of Hooker Chemicals Ltd., in North Vancouver, B. C. The plant, which opened this fall, is Canada's first chlor-alkali producing point west of the Rockies.

By rail and barge, it will supply caustic soda and chlorine for making and bleaching pulp; more caustic soda to help sweeten petroleum refinery products and to produce plywood adhesives.

Hooker customers around Vancouver will enjoy a freight saving on these chemicals, which formerly came into the area by sea-going barge from our Tacoma plant.

Is your supplier growing with you?

In its modest way, this new Hooker plant underscores a point that you may consider important in your own expansion plans.

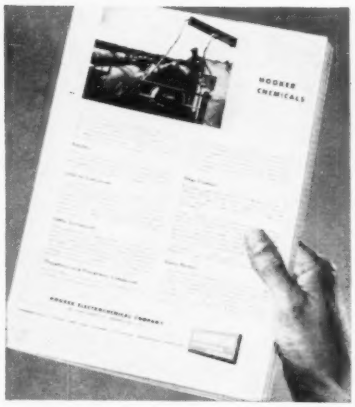
You have much to gain by tying up with a chemical supplier geared to the spread of industry into new areas; accustomed to anticipating your requirements of tomorrow, even while serving you dependably today.

Close to the major industrial centers of the East, Midwest, and West Coast, Hooker plants and stock points give you quick, dependable service when you need it. All Hooker caustic soda plants and distributing points are on deep water. This makes transportation extremely flexible. It tends to minimize shipping costs, and permits a choice that can make a big difference if an emergency occurs.

And if you buy l/c/l, there's an authorized Hooker distributor nearby, ready to meet your needs for caustic soda and other Hooker chemicals.

If you'd like to see how this flexible, fast-moving supply team can strengthen your position on chemicals, drop us a line and we'll get the facts to you promptly.

New 12-page bulletin lists Hooker products



You'll find a complete up-to-the-minute listing of Hooker chemicals in this new 12-page bulletin.

Indexed for ready reference, it lists the chemicals you can buy from us in commercial quantity, including chemicals sold under the NIALK® and OLDBURY® brand names.

Under each product you'll find a short description and condensed listing of properties, actual and suggested uses, and shipping containers. The bulletin also sums up for you the major types of processing performed at Hooker.

If you'd like to have this up-to-date timesaver in your file or on your desk, just check the coupon for a copy of new *Bulletin 100-A*.

Here's data on phosphorus-sulfur compounds

Every time you strike a match, you're helping to justify the market researchers' predictions for one of our OLDBURY Products: red phosphorus.

This fascinating element got off to a commercial start in this country in 1910, on the site of the present OLDBURY Products plant in Niagara Falls.

Today many other items that must burn up before they can do anyone any good are made with OLDBURY *red phosphorus* or *phosphorus sesquisulfide*, P_4S_3. These include matches, fireworks, safety and signal flares, fusees, and smoke screens.

Your product may require another equally useful, though less dramatic, way of putting phosphorus to work:

Phosphorus Pentasulfide, P_4S_{10}. We make it in three particle-size grades of powder, and as a fused solid. Phosphorus content is 27.8% minimum. Powder forms come in lever-pak drums, 150 lbs. net; solid in single-trip steel drums, 215 lbs. net.

These products are available, as always, under the highly reputed OLDBURY label. For more information, we suggest you check the coupon for new technical data sheets just completed.

For more information on chemicals mentioned on this page, check here:

- ☐ Caustic Soda
- ☐ New list of products—Bulletin 100-A
- ☐ Phosphorus, white
- ☐ Phosphorus, red
- ☐ Phosphorus Pentasulfide
- ☐ Phosphorus Sesquisulfide

Clip and mail to us with your name, title, company address. *(When requesting samples, please use business letterhead.)*

HOOKER ELECTROCHEMICAL COMPANY
701-2 FORTY-SEVENTH STREET, NIAGARA FALLS, N. Y.

Niagara Falls Tacoma Montague, Mich. New York Chicago
Los Angeles Philadelphia Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

Yes, but what is it?

CALL Nalcamine G-13 whatever you like. Our chemists call it 1-(2-hydroxyethyl)-2-heptadecenyl-2-imidazoline . . . but remember it is *a cationic surface-active tertiary amine* with almost unlimited use possibilities... As an emulsifier, a demulsifier, an antistatic agent, an *adjustable* water- or oil-soluble salt, a wetting agent, a dispersing agent, and so on and on.

For technical data and laboratory samples of this and other reasonably priced, uniform-purity Nalcamines, just write or telephone Nalco.

NATIONAL ALUMINATE CORPORATION
6185 West 66th Place • Chicago 38, Illinois
PORtsmouth 7-7240
CANADA: Alchem Limited, Burlington, Ontario
NORTHWESTERN UNITED STATES, HAWAII and ALASKA: The Flox Company, Inc., Minneapolis 3, Minnesota
ITALY: Nalco Italiana, S.p.A.
WEST GERMANY: Deutsche Nalco-Chemie GmbH
SPAIN: Nalco Espanola, S. A.

Nalco®

PRODUCTS . . . *Serving Industry Through Practical Applied Science*

now feel that the generally preferred estimate of caustic demand (*p. 69*) should be even lower, making the gap still wider.

Definition: *CW* asked representatives of the chlorine-caustic industry about the disagreement between the figures for so-called "consumption." The reply: "When caustic is taken out of circulation (no matter how it's done), it's considered to be consumed." Most industry spokemen object to the word "dumping," prefer to say excess caustic is "unaccounted for" or "removed from the market." Nonetheless, producers agree that there's "too much of the stuff around."

Growth, but No Boom: By the end of '58, caustic consumption by the chemical industry should hit some 1.2 million tons, about 30% of the total consumed. In '55, about 25% of U.S. caustic demand was by the chemical industry.

Second most important caustic buyers are rayon and cellophane film makers. By the end of '58, some 675,000 tons of the material (about 17% of total consumption) will be channeled here. But there's one hitch: rayon production is being continuously buffeted by competing synthetic fibers—especially nylon in the tire-cord market.

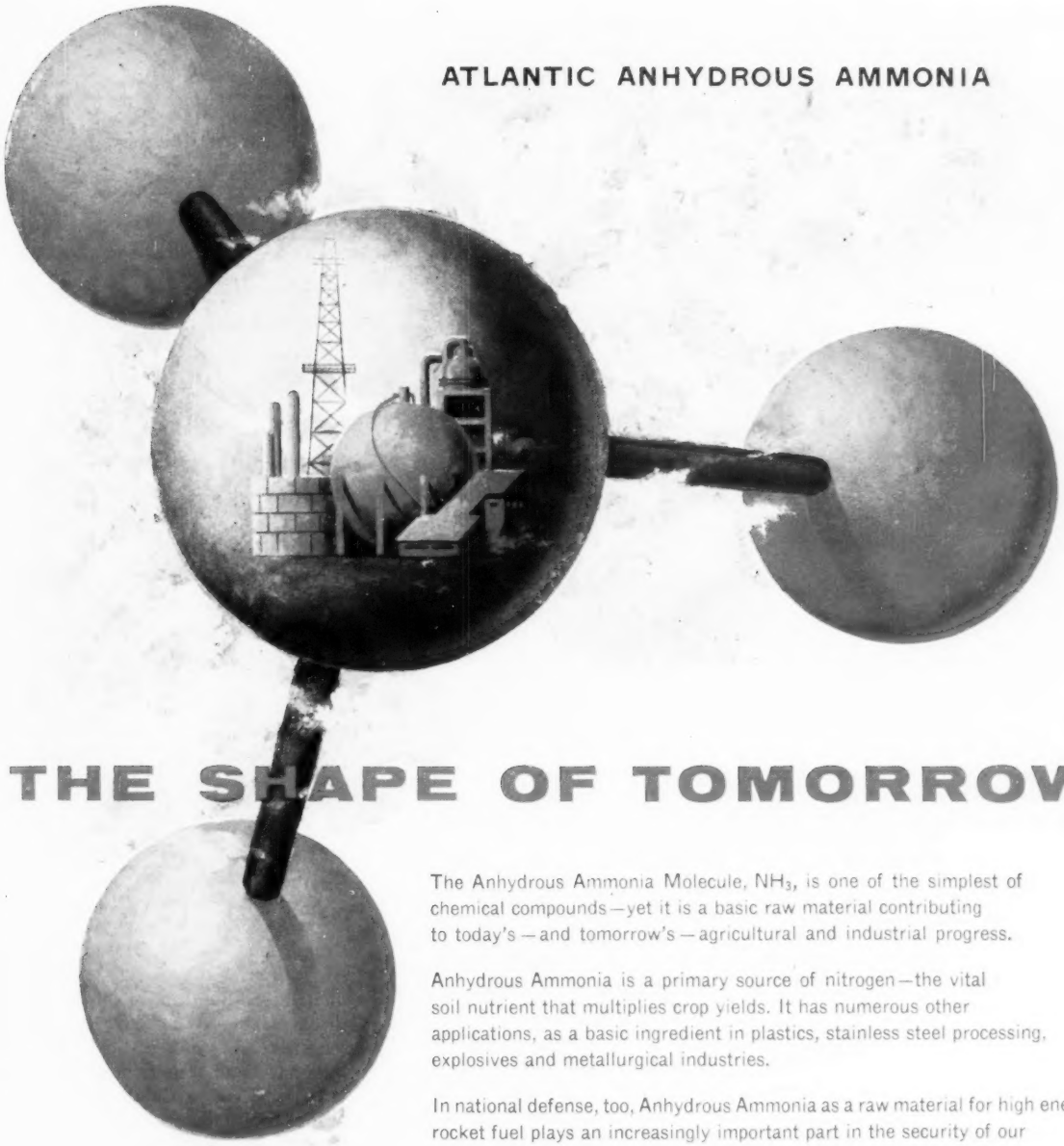
Cellophane output continues to mount in spite of stiff competition from polyethylene, styrene and other film packaging materials. Output last year probably hit 400 million lbs.

Pulp-Paper Healthy: The paper and pulp industry, another voracious consumer of caustic soda, is expected to take some 330,000 tons in '58. Total output of paper and paperboard should hit some 34 million tons by the end of this year, compared with 31.3 million tons in '56.

Caustic requirements for metallurgical uses will likely be some 300,000 tons in '58. Caustic consumption by the steel industry, however, fell off in '57; needs of the steel industry—despite predictions of a bonanza year—dwindled considerably. Estimated output of steel in '57 probably was about 113 million tons, just a trifle lower than the 115 million tons in '56. Estimated output for '58 is about 109 million tons of steel—4 million tons less than in '57.

Export Lull: Caustic exports will probably show no great gains in the years to come. Reason: increased

ATLANTIC ANHYDROUS AMMONIA



THE SHAPE OF TOMORROW

The Anhydrous Ammonia Molecule, NH_3, is one of the simplest of chemical compounds—yet it is a basic raw material contributing to today's—and tomorrow's—agricultural and industrial progress.

Anhydrous Ammonia is a primary source of nitrogen—the vital soil nutrient that multiplies crop yields. It has numerous other applications, as a basic ingredient in plastics, stainless steel processing, explosives and metallurgical industries.

In national defense, too, Anhydrous Ammonia as a raw material for high energy rocket fuel plays an increasingly important part in the security of our nation today—and in the development of new aviation techniques for tomorrow.

The Atlantic Refining Company is a basic producer of Anhydrous Ammonia and other essential petrochemicals, all helping to shape progress in many fields, all characterized by uniformly high quality and stable supply.

For information on Atlantic Anhydrous Ammonia, and other Atlantic Petrochemicals, write or wire Chemicals Division, The Atlantic Refining Company, Philadelphia 1, Pa.

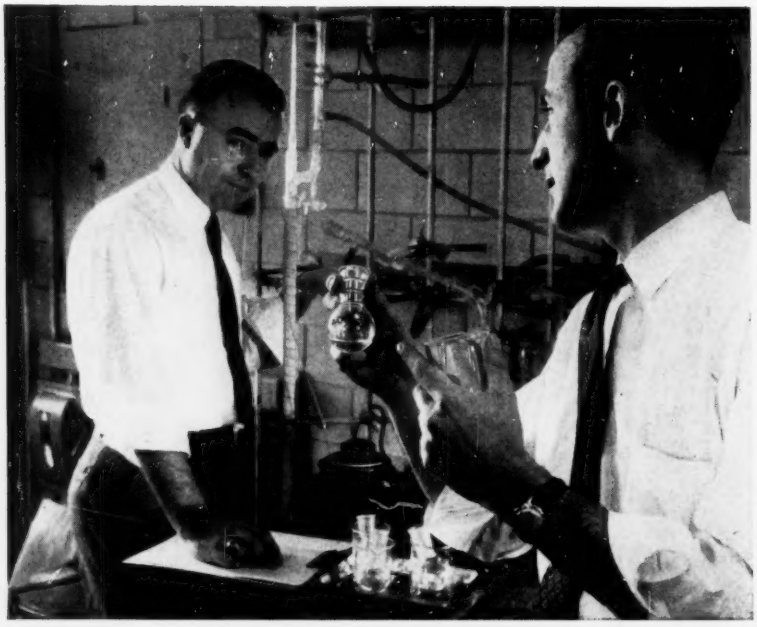
ATLANTIC PETROLEUM CHEMICALS

Providence
Charlotte
Chicago
Los Angeles

In Canada: Naugatuck Chemicals Division of Dominion Rubber Company, Ltd.

In Europe: Atlantic Chemicals SAB, Antwerp, Belgium

In South America: Atlantic Refining Company of Brazil, Rio de Janeiro



"Look at this sample of the stripped coconut... caprylic under zero point five!"

Depend on it – the caprylic acid content of GROCO 26 Stripped Coconut Fatty Acid never exceeds 0.5%. The capric acid content is reduced to less than 6%. The caproic is removed completely. Composition –

Caprylic acid	0.5%
Capric acid	5.5%
Lauric acid	50.0%
Myristic acid	23.0%
Palmitic acid	6.0%
Stearic acid	2.0%
Oleic acid	11.0%
Linoleic acid	2.0%

Also important – the amount of each component in GROCO 26 Stripped Coconut Fatty Acid never varies by more than ±5% of the specified amount. Lauric content is higher than you find in competitively priced acids. Color is lightest. Odor blandest. Heat stability and shelf life are outstanding.

Two facts explain these advantages. We use only coconut oil as raw material. We split and distill continuously by a standard procedure – always the same, shipment after shipment.

"Always specify A. Gross" . . . GROCO 26 . . . There's no better way to begin an end-product.

Have you a detergent, cosmetic, resin or other problem that GROCO 26 might solve? Send for test samples . . . Would you like more information? Ask for our brochure, "Fatty Acids in Modern Industry."

FATTY ACIDS

Stearic Acids • Coconut Fatty Acids • Tallow Fatty Acids • Vegetable Fatty Acids
Red Oils • White Oleines • Hydrogenated Tallow Glycerides • Hydrogenated Fatty Acids

a. gross & COMPANY

295 Madison Ave., N. Y. 17, N. Y. • Factory: Newark, N. J.
Distributors in principal cities • Manufacturers since 1837

Estimated '58 caustic soda end-use

(thousand tons)	
For other chemicals	1,225
Rayon and film	675
Pulp and paper	330
Metallurgical	300
Export	275
Petroleum refining	250
Lye and cleaners	180
Textiles	150
Soap	65
Others	550
Total	4,000

foreign production of the material will whittle down the number of foreign buyers. About 275,000 tons of caustic are expected to be shipped from the U.S. this year—an insignificant gain over the 264,000 tons exported in '56.

Consumption patterns of caustic soda usage in petroleum refining, for cleaners and in textile manufacturing, are expected to follow the general level of increased industrial activity in these fields. But demand for caustic for soapmaking is definitely on the downgrade as synthetic detergents continue to increase in popularity.

Break the Tie to Chlorine? Faced with the problem that present demands for caustic can't absorb the output, producers are tinkering with novel process ideas. One involves making chlorine without its traditionally attendant by-product, caustic. Another involves using caustic soda to make soda ash (*CW, Oct. 19, '57, p. 109*). These methods are expected to have little impact on excess caustic.

The facts are that caustic output must continue to outpace demand; more capacity for electrolytic chlorine —hence caustic—is coming onstream. At best, there will be only a modest increase for caustic demand. The obvious conclusion: caustic soda producers will continue to wrestle with their perennial problem: What to do with the surplus?

Airco quality control gives you a cost-saving difference

VINYL ACETATE MONOMER

In some vinyl acetate polymerizations the slightest variation of the monomer from one batch to the next may require you to alter catalyst concentrations or make other changes in your process. When you use AIRCO Vinyl Acetate Monomer, you eliminate these costly adjustments.

For AIRCO gives you more than high quality monomer – AIRCO gives you *uniformly* high quality. Every shipment of AIRCO Vinyl Acetate Monomer is carefully pretested to insure consistent reaction characteristics from lot to lot.

So, when you order vinyl acetate monomer, it's just good business to specify AIRCO. And, if you want technical assistance, call AIRCO's New York office. A competent technical staff is ready to work with you.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . .

AIRCO

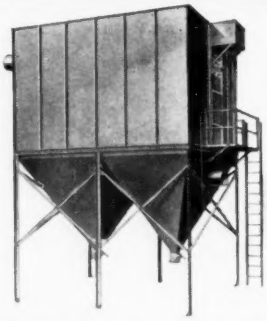
AIR REDUCTION CHEMICAL COMPANY

A division of Air Reduction Company, Incorporated
150 East 42nd Street, New York 17, N. Y. • YUkon 6-7116
Represented Internationally by Airco Company International

there is a Dracco unit

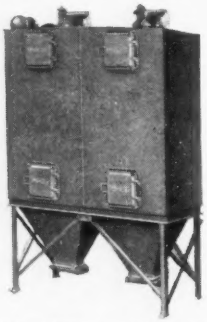
Whirl-Clones answer the need for efficient cyclone-type collection. Widely used with high temperatures, corrosive materials or large particle sizes. Dracco design assures efficient separation in units to 8-foot diameter. Welded construction assures minimum wear and long life.

Uni-Filters can be located at dust sources for efficient control with lower piping and power costs. Compact self-contained units with capacities from 300 to 1800 cfm require little space, are shipped ready to install and can be easily relocated.

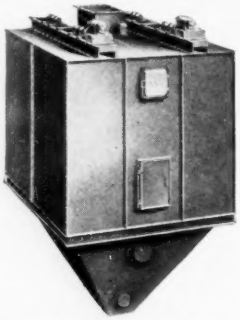


Multi-Bag Filters, basic Dracco unit, combine moderate cost with multi-duty versatility. Compact, space-saving housing can be installed inside or outside, contains unusually large cloth area. Models for intermittent or automatic, continuous service in wide size range with unsurpassed efficiencies.

to solve almost every



Dustomatic Filters are designed for continuous dust and fume recovery under heavy-duty conditions such as non-stop operation, high temperatures, heavy dust loads and high static pressures. Often used as integral part of chemical and metallurgical process equipment.



"DH" Filters are probably the finest units for automatic dust collection under severe conditions. Extremely rugged, they collect heavy, dense or sticky dusts that cannot be handled any other way. Well worth their extra cost because of their high capacity-to-size ratio.

"X" Filters, soon to be announced, will provide the long-sought answer to high-efficiency collection of hot or corrosive dusts and fumes. These advanced-design units are now being extensively field tested at temperatures to 600°F.

dust or fume problem

This extensive equipment line plus Dracco's 40-year reputation for solving the toughest dust problems are sound reasons for talking to Dracco first.

DRACCO CORPORATION • 4080 East 116th Street • Cleveland 5, Ohio

Complete 40-page catalog on Dracco Dust Control Equipment contains detailed data and valuable reference material. Write for Bulletin 800.

DRACCO *airstream* conveyors
dust control equipment

Market Newsletter

CHEMICAL WEEK
January 18, 1958

Price reduction in refined glycerine at week's end was a partial fulfillment of an earlier prediction (*CW Commodity Forecast, Dec. 28, '57*) —it was a modest decline (only ⅛¢/lb.), but it happened sooner than had been anticipated.

Affected are tank prices on both natural and synthetic glycerine; c.l. and l.c.l. tags remain unchanged.

Natural producers were first to move, apparently in an effort to steal a competitive march on synthetic makers, but the latter followed suit promptly. Result: natural glycerine (96%) is down to 26⅞¢/lb., dynamite grades, 27⅝¢. Synthetic material now costs 27⅞¢/lb.

Glycerine demand hasn't been too lively, and chances are, unless business picks up, last week's price shaving may just be a forerunner of further action.

•

Three polypropylene glycols are in for a substantial cut. Union Carbide Chemicals dropped prices 2¢/lb. across the board on its Niax diols PPG-425, PPG-1025 and PPG-2025, effective immediately. New delivered prices on the polyurethane intermediates: 23¢/lb. in tanks; 25½¢, c.l.; 26½¢/lb., l.c.l.

Carbide attributes the reductions to stepped-up output activity (at its West Virginia plant) sufficient to bring about greater economies in production costs. The savings, says the company, are being passed along to consumers.

•

Folic acid prices—as are most vitamin prices—are being buffeted by sharp domestic-foreign competition. Latest result of the import pressure on folic, which has been building steadily over the last several months, is a 50¢/gram reduction in domestic schedules. Also reported in the trade: a 20-25¢/gram cut on imported material.

American Cyanamid last week led U.S. companies by reducing its USP acid to 70¢/gram (from a previous $1.20), but within hours reports were being circulated that importers had cut their prices to 60¢/gram. (About eight months ago, U.S. makers sliced 20¢/gram off tags because of similar market conditions; hence, the present move was not surprising.)

Consumers now ask: Is another round of price-slashing in the works? At the moment, U.S. makers are "studying the situation."

•

Make it 21 sulfuric acid plants for General Chemical. Allied's division has just announced that production has started at its latest sulfuric installation in Elizabeth, N.J. The plant will give rail, truck and barge service to industrial consumers in North Jersey, metropolitan New York and New England.

Available, too, says Allied, are facilities for decomposition and regeneration of by-product spent acids, "which will help solve troublesome disposal problems for many industries using sulfuric."

The new plant, however, probably will also add to the scrambling for acid customers in this Northeastern area—a condition that's often been rough (*CW Market Newsletter, April 27, '57*).

•

A new $7.5-million air liquefaction plant will be dedicated this week in southern California. Air Reduction's plant and supporting facilities at City of Industry, Calif. (industrial community south of San Bernardino), will develop 75 tons/day of liquid products, more than 500 million cu. ft./year of gas. Products to be manufactured: oxygen, nitrogen and argon. Liquid helium will also be compressed from raw helium purchased from the U.S. Bureau of Mines.

Airco President John Hill was slated to speak at the dedication ceremonies. His topic: some ideas about future uses of liquid oxygen as an oxidizing agent for rocket fuel.

•

Another dedication boosts this country's low-pressure polyethylene capacity some 50 million lbs./year. It's W. R. Grace's Polymer Chemicals' new $20-million plant at Baton Rouge, La., which will turn out the high-density material. It will be offered under the tradename Grex.

The Grace plant is the latest in the parade of U.S. low-pressure polyolefin installations (*CW, Dec. 7, '57, p. 31*) rapidly pushing total industry capacity well toward 300 million lbs./year.

•

You can soon scratch Italy off the list of potash customers. That country, which has been spending some 4 billion lire ($6.4 million) a year to import about 50,000 tons/year of potash (K_2O), will likely switch to exporting the material. Why? Montecatini is building a factory near Campofranco, Sicily, to transform kainite into potassium sulfate fertilizer. The kainite, with an average 12% K_2O, will be mined at a rate of 2,000 tons a day, will be concentrated and turned out as fertilizer at a top rate of 350 tons/day.

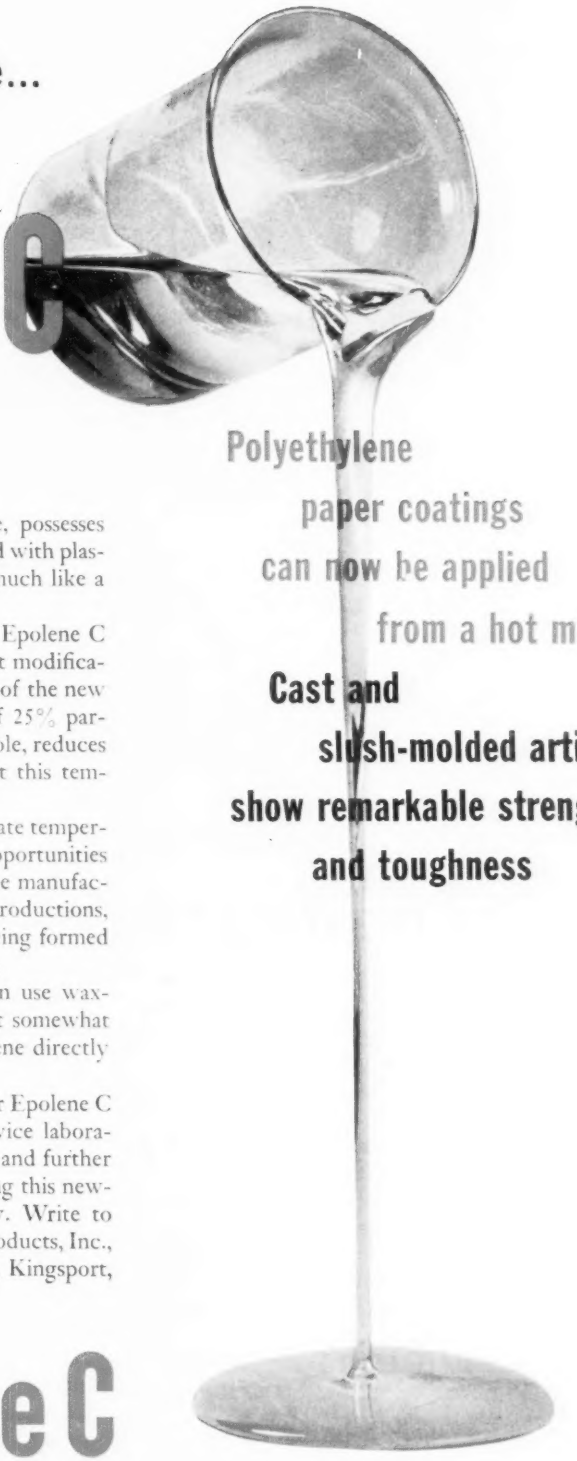
SELECTED PRICE CHANGES—WEEK ENDING JANUARY 13, 1958

	Change	New Price
UP		
Tankage, Chicago, animal feeding, 9-11% ammonia, bulk, unit ton	$0.25	$6.25
Tin metal (Straits)	0.02	0.94
DOWN		
Diphenylamine, rfd., flake, bgs., c.l., wks., frt. equald.	$0.02	$0.31
Folic acid, USP, bots., fib. dms., kilo lots or more, per gram	0.50	0.70
Mercury, metal, 76-lb. flasks	2.00	223.00
Tungsten metal, powd., 2-5 microns, dms., wks.	0.25	3.85

All prices per pound unless quantity is stated.

New low-melt polyethylene...

Epolene C



Polyethylene paper coatings can now be applied from a hot melt

Cast and slush-molded articles show remarkable strength and toughness

Epolene C, a new type of polyethylene, possesses many of the properties generally associated with plastic grade resins and yet can be handled much like a moderate to high melting point wax.

Because of its wax-like characteristics, Epolene C can be handled as a melt, with or without modification. At 300°F, for instance, the viscosity of the new resin is 8,000 centipoises. The addition of 25% paraffin, with which it is completely compatible, reduces the viscosity to only 1,300 centipoises at this temperature.

The pourability of Epolene C at moderate temperatures points the way to new product opportunities and low-cost production techniques in the manufacture of toys, novelties, art objects and reproductions, housewares or any product capable of being formed by slush or rotational molding or casting.

With Epolene C, paper converters can use wax-coating machines, modified to operate at somewhat higher temperatures, to apply polyethylene directly to paper sheets or web.

Investigation of these and other uses for Epolene C is continuing at Eastman's customer service laboratories. We will be glad to supply samples and further information and to assist you in evaluating this newest addition to the polyethylene family. Write to Chemical Division, Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, Kingsport, Tennessee.

Epolene C

EASTMAN LOW-MELT POLYETHYLENE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cleveland; Cincinnati; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Measuring the median Midwest farmer: he buys 10 tons of fertilizer every year for the 160 acres that

Market Research on the Farm Yields

Confronted with ever mounting capacity but static sales, fertilizer companies this week have the market research tape measure on one of the industry's best customers—the Midwest farmer.

In what's probably the most comprehensive study made to date, Allied's Nitrogen Division put more than 70 questions about fertilizers to 400 statistically selected farmers in Ohio, Illinois, Indiana and Michigan.

The study was primarily designed to strengthen marketing efforts for mixed fertilizers. But the results* hold considerable import for raw material producers, fertilizer manufacturers and formulators. And, in some cases, the findings may even be applicable to pesticides, and other nonfertilizer farm chemicals.

Surprise: Biggest surprise in the report is the high percentage (76%) of farmers who expect to use more commercial fertilizers in the future. Only about 6% expect to use less. These findings are a sharp rebuttal to forecasts of reduced consumption because of difficult farm economic conditions. More than 30% report that they'll begin to use fertilizer or will use more in the next few seasons.

Some changes in application methods are certain; better than 20% plan a change. And about 20% are planning a switch to liquid materials, 10% to more concentrated types.

Liquid Lode: Prospects for solutions, the survey indicates, are especially bright. Slightly more than half of the respondents anticipate wider use of liquid fertilizers; only 17% expect less.

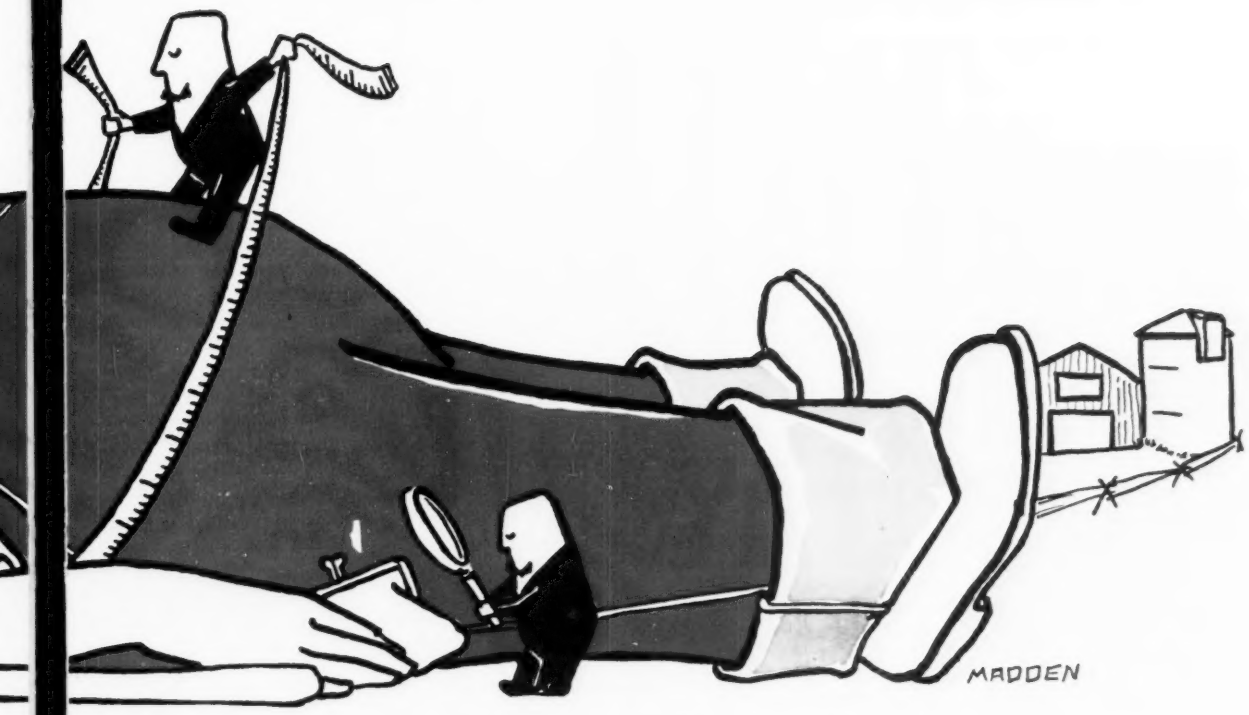
Most farmers surveyed believe there are two main advantages of solutions: they're "easier to apply (so say 46% of respondents); give plants a quicker start (26%)." Farmers who use solutions are even more convinced of the benefits (82% and 43%, respectively).

Nonetheless, manufacturers have some hurdles to clear in expanding solution sales. Highest: the farmer's need of special application equipment. Some 39% give that reason for not using or not planning to use solutions. Other important reasons stem from lack of solution availability in the area (12%) and a belief that liquids are more expensive (11%).

To counter such objections, fertilizer producers may offer "do-it-yourself" plans for homemade applicators, improve distribution facilities and stress benefits of solutions in promotion.

Whither Testing: Unexpectedly, a lackadaisical attitude toward soil tests turned up. About 53% of the

*Applies only to the Midwest area. Southern fertilizer practices and buying habits are expected to differ, will be subject of another survey.



...e has under cultivation. He has been operating a farm for at least 18 years.

New Clues for Ag Chemical Sales

respondents either did not make tests or failed to follow recommendations when tests were made. Previous knowledge of soil needs (claimed by 37%) and "neglect" (32%) were the major causes for not analyzing needs of the soil. Where tests were performed but not used, farmers cite as major reasons "impracticalness of following recommendations" (52%), and "lack of money" (16%) while some of them (10%) say they had "no time" to analyze.

The farmer's attitude toward testing is especially important to producers. That's because study after study has shown that farmers use far less fertilizers than tests show the soil needs. Adherence to test recommendations would largely ease the current overcapacity plaguing the industry. It's clear that something more than the widely distributed free soil test containers is needed in the way of promotion.

Buying Patterns: Most farmers (over 50%) make the choice of their fertilizer brand in the spring, about 15% make their selection in the winter season. About two-thirds of those canvassed purchase from local dealers and about 19% buy from co-ops.

Relatively few (33%) farmers "shop around" before buying. That's because of a strong loyalty to the local merchant and a feeling that there's no price differential. But among those who do "shop," lower price is the principal object.

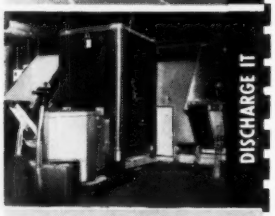
Nonetheless, price is apparently the most important factor in the purchase decision. A total of 53% of those surveyed rank it first or second in importance in brand selection. A sizable portion—41-66%—of the sample farmers express willingness to pay slightly higher prices if satisfied with product quality, dealer reputation, manufacturer reputation or product form.

If offered a choice between comparable fertilizers that differ in price by $5-$6 per ton, 68% of the farmers would buy the cheaper brand. Farmers are conscious of brandnames but are not loyal to a particular brand.

Difficulties in encouraging bulk sales are underscored by the survey: only about 20% of the farmers purchase all of their needs at one time, only 6% purchase dry materials in bulk. The big stumbling blocks: inadequate storage (34%); "get-it-as-I-need-it" attitude (23%); easier handling of small quantities (19%).

Dealer Dominance: The survey confirms an opinion long held by ag chemical sales managers—that the dealer is the marketing kingpin. When in need of information, more than 57% of the farmers turn first to the dealer, or salesman; only 30% first talk to

in bulk handling
only
TOTE
SYSTEM*



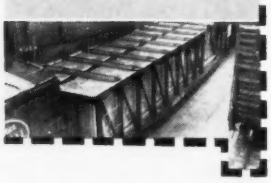
offers every one of these important advantages

Tote System is a complete, mechanical, automatic bulk handling system. It is based on metal bins—aluminum, stainless or carbon steel, monel, or magnesium—plus filling and discharging equipment. Here is what it will do:

1. Tote System effects important economies by eliminating recurring container costs; eliminating product loss, contamination and deterioration; reducing labor and handling costs; reducing warehouse storage space requirements; and preserving original product quality.
2. Tote System handles a diverse list of products, including liquids, both in-plant and inter-plant.
3. Tote System speeds up weighing and blending operations, accurately and automatically.
4. Tote System permits you to weigh incoming materials as a check against invoice weight, and for a permanent inventory record.
5. Tote System permits the use of a minimum, uncomplicated conveyor system with an accompanying reduction in clean-up and maintenance time.
6. Tote System, in handling food products, meets the requirements of all existing sanitation codes.
7. Tote System permits complete transportation flexibility. Tote Bins can be shipped by rail** or truck, or they can be left in the plant and filled from hopper cars or trucks.
8. Tote System can be adapted easily to future requirements. Plant layouts can be changed simply by re-locating discharge stations. Operations can be expanded merely by procuring additional Bins. And Bins can be used interchangeably for different products.
9. Tote System, in small and medium sized installations, requires no more labor to operate than a fixed storage bin system. In extremely large installations, another man may be required, but, in most cases, his time is more than offset by the elimination of highly-paid electronic experts needed to maintain and operate complicated fixed bin storage and conveying systems.

**CONTAINER CAR

Railroad Container Cars with either 26 or 28 Tote Bins on a car are available on lease arrangement. One man can unload the car in 35 minutes, using a lift truck. A mileage allowance of 3.7 cents is paid for every mile this car travels.



*TOTE AND TOTE SYSTEM REG. U. S. PAT. OFF.

Why not let our engineers survey your plant at no obligation? Meanwhile, write for new catalog containing complete details.

TOTE SYSTEM, INC.
820 SOUTH 7th, BEATRICE, NEBR.

their local agricultural officials.

While some 46% of the sample say they do not discuss their requirements with anyone, 29% say they discuss needs with dealer or manufacturer's salesman. Dealer discussion subjects: analysis type, price, quantity, brand and form. The actual buying decision, the survey shows, is influenced most by the dealer.

Advertising Clue: In terms of advertising, the findings suggest intensive brandname promotion directed at the farmer and technical promotion supplied to dealers and government agents. There's doubt about the value of advertising beamed at the rural housewife. The survey indicates that about 5% of the farmers discuss fertilizer prices with their wives.

Allied plans to make the survey's results available to the fertilizer industry in a series of reports. The first, on buying habits and the fertilizer outlook, is now in preparation. A second report will probe the relative value of radio, TV, farm newspapers, billboards and other media in reaching the rural customer.

Undoubtedly, the survey will serve as a much needed guidepost in improving fertilizer merchandising. It may help to influence the buying habits of the Midwestern farmer—a man already known to Madison Avenue as a "tough man to influence."

DATA DIGEST

- **Silicone compounds:** Data sheet describes organosilicone polymers and their usefulness as special machine or metal lubricants, release agents for plastics, emulsifying agents or emulsion breakers, and as defoaming agents. Union Carbide Corp.
- **Alkali lignin:** Technical bulletin provides data on Indulin, a surfactant, extender, dispersant, reinforcent, binder, sequestering agent and protective colloid. Properties in aqueous and in solvent systems are illustrated with charts and tables. West Virginia Pulp and Paper Co. (Charleston, S. C.).
- **Peracetic acid:** New 48-page booklet describes peracetic acid and reactions of epoxides, also lists properties and possible uses of 12 epoxides now available in research samples. Union Carbide Chemicals Co.
- **Plastics:** Plaskon plastics and resins are discussed in a new booklet. One section covers melamine, urea

For new and better monomeric and polymeric esters in the rubber, plastics, plasticizer, synthetic lubricant and chemical industries

a major basic source of higher-quality ADIPIC ACID

If you use or contemplate using Adipic Acid, you can benefit two ways by buying from National Aniline:

Our new, non-captive production of ADIPIC ACID at Hopewell, Va. sets a new industry standard of quality: Strength 99.8% minimum; Moisture 0.2% maximum with iron and volatile acids way down in ppm. Color is exceptionally light.

Equally important, dependable volume delivery is assured by an efficient, direct continuous process plant supplied with all basic raw materials from within the Allied group.

So that you can evaluate National® Adipic Acid in your own application, we will be glad to send a liberal working sample and to quote on your needs.

Write also for TECHNICAL BULLETIN I-12

This comprehensive 8-page technical bulletin on National Adipic Acid gives physical and chemical properties; principal reactions of the carboxyl and alpha methylene groups; solubility curve, and suggested uses with copious literature references.

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago
Greensboro Los Angeles New Orleans Philadelphia
Portland, Ore. Providence San Francisco Toronto

designed for confidence **Picco** resins

Trust is warranted in **Picco Resins**. Carefully manufactured in large quantities, **Picco Resins** assure uniformity and high quality.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION
Clairton, Penna.

p-MENTHANE HYDROPEROXIDE

ORGANIC PEROXIDES

LUCIDOL
DIVISION
WALLACE AND TIERNAN
INCORPORATED
DEPT. 3
BUFFALO 5, N. Y.

AN EXCELLENT CATALYST FOR EMULSION AND POLYESTER REDOX POLYMERIZATIONS

Write for Data Sheet

SALES

and alkyd molding compounds. Another section is devoted to industrial resins including polyester resins, polyurethane foams, adhesives, urea resins, and phenolic friction resins. Barrett Division, Allied Chemical & Dye Corp. (New York).

• **Thermoplastic resin:** Specification sheets list electrical, chemical and physical properties of five Cycolac thermoplastic resin types. Borg-Warner Corp. (Gary, Ind.).

• **Polyvinyl alcohol:** Manual on the physical properties, modifications and uses of various grades of Gelvatol polyvinyl alcohol. Separate section presents selected chemical reactions of polyvinyl alcohol. Shawinigan Resins Corp. (Springfield, Mass.).

• **Resin:** Technical bulletin on Maraset resin 341, a lead-filled epoxy casting material, emphasizes applications in fabricating radioactivity-shielding containers and structures for instrument housings and pipe and valve fittings. Properties summarized include dimensional stability, casting ease, bonding characteristics, hardnesses, density, and availability in various lead loadings. Marblette Corp. (Long Island City, N.Y.).

• **Polyesters:** Eight-page booklet discusses use of polyesters for surface coatings, stresses applications on metal finishes, masonite and wood. Reichhold Chemicals, Inc. (White Plains, N.Y.).

• **Silicones:** Reference guide lists 150 commercially available silicone products. Contains detailed charts, graphs and data on properties and performance. Dow Corning Corp. (Midland, Mich.).

• **Plastic color:** Report shows how plastics are color-matched to other materials by a method proved in more than 38,000 plastic color formulations. Eastman Chemical Products, Inc. (Kingsport, Tenn.).

• **Plastics:** Lexan polycarbonate resin and other thermoplastic molding are compared in a chart that outlines electrical and physical properties as well as molding characteristics. Chemical Division, General Electric Co. (Pittsfield, Mass.).

• **Plasticizer:** Typical analysis and properties of Sole-Onic Pi isopropyl palmitate, are discussed in a technical bulletin that suggests its use in skin creams, hair preparations, lipsticks, and hormone or therapeutic products. Sole Chemical Corp. (Chicago).

Want the New CW Index or CW Reprints?

- Forecast '58. Preview of the coming year for the CPI.
- Petrochemicals—fastest-growing member of CPI.
- Plastics' outlook—a spectrum of end-products.
- How to deal with ideas from outsiders.
- What a salesmen's incentive plan can do for you.
- How to turn the atom to profit.
- Top chemical executives' compensation.
- How to control paper work to cut overhead.
- Six ways to help you select a capital venture.
- Past, present and future of pesticides.
- The fast-growing seaweed-colloid industry.
- Chemicals in the rocket program.
- How operations research can serve you.
- Ways to make your staffers more creative.

Just check the desired items on the coupon below and mail to:

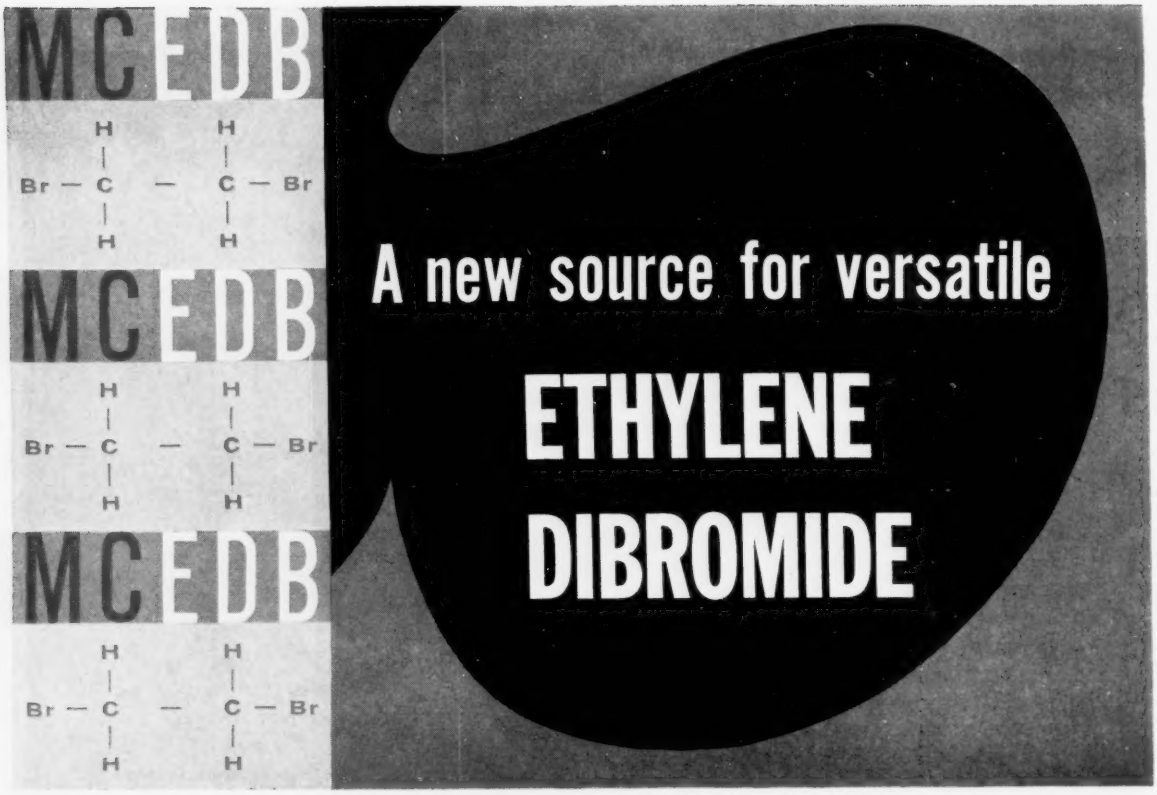
Chemical Week, Reprint Dept., Room 2400, 330 W. 42nd St., New York 36, N. Y.

Forecast '58 ..... $1 ☐ Send —— copies
Index to Vol. 80, Jan.-June '57 50¢ ☐ Send —— copies
Paperwork Control ..... $1 ☐ Send —— copies
Your Next Capital Venture ..... $1 ☐ Send —— copies
Petrochemicals ..... $1 ☐ Send —— copies
Plastics Outlook ..... $1 ☐ Send —— copies
Ideas from Outsiders ..... $1 ☐ Send —— copies
Salesmen's Motivation Makes the Difference $1 ☐ Send —— copies
Is Top Chemical Management Underpaid? $1 ☐ Send —— copies
Time to Turn the Atom to Profit $1 ☐ Send —— copies
Pesticides—Heading for $1 Billion/Year (96pp.) $1.50 ☐ Send —— copies
Dyes & Pigments—full-color reprint $1 ☐ Send —— copies
Reorganizing Your Company $1 ☐ Send —— copies
Seaweed Colloids $1 ☐ Send —— copies
Guided Missiles $1 ☐ Send —— copies
A Better Way to Plan Your Company's Growth $1 ☐ Send —— copies
Operations Research $1 ☐ Send —— copies
New Creativity Gambits $1 ☐ Send —— copies
Synthetic Detergents $1 ☐ Send —— copies

Enclosed is $ **for this order. (Special bulk rates on request.)**

Name .....

Address



MICHIGAN CHEMICAL CORPORATION NOW OFFERS YOU the multiple advantages of high purity ethylene dibromide. The established applications for this hard-working chemical include . . .

. . . wide use as an agricultural fumigant.
. . . exceptional efficiency as a solvent for waxes and gums.
. . . wide use as a pharmaceutical intermediate since both bromine atoms are replaceable.
. . . service as a reagent in the synthesis of dye intermediates.
. . . combination with tetraethyl lead to increase gasoline engine efficiency.

Now that you can count on uninterrupted delivery — up to tank car quantities — your research and development staff may uncover new applications.

Ethylene dibromide is a clear, colorless, heavy liquid with a sweet characteristic odor. It is very stable and is nonflammable.

PROPERTIES:

Boiling point	131.4°C.
Specific gravity at 25/25°C.	2.172
Pounds a gallon at 25°C.	18.07
Freezing point	9.3°C.
Flash point	None
Molecular weight	187.9

Solubility, grams per 100 grams solvent:

Alcohol at 25°C.	Soluble
Carbon Tetrachloride at 25°C.	∞
Ether at 25°C.	∞
Water at 25°C.	0.43

SPECIFICATIONS:

Color	Colorless
Specific gravity at 20/20°C	2.175-2.185
Acidity: 0.01N NaOH/100 ml.,	less than 1 ml.
Boiling range, 5-95% within	2.0°C.

Ask your Michigan Chemical sales representative for more information and samples. Or write or phone: Saint Louis, Michigan - 4511

C-57-2
*Reg. U. S. Pat. Off.

MICHIGAN CHEMICAL CORPORATION

571 North Bankson Street, Saint Louis, Michigan

EASTERN SALES OFFICE: 230 Park Avenue, New York 17, New York

Agava's Claude Spray, head of a small but growing specialty business, has one major problem . . .

Selling 169 Chemicals in One Package

A problem that has plagued many small chemical specialty makers—how to boost an unusual and little-known chemical product into substantial sales figures—is the job ahead for Claude Spray, president and founder of Agava Products Inc. (Jersey City, N.J.).

The company's one and only product: Agava, a dark-brown juice extracted from the leaves of the agave plant, grown in tropical countries.

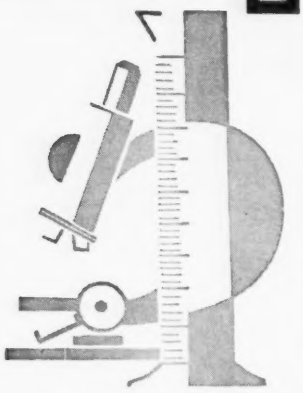
According to President Spray, the company's product has application in 100 specialty items. But practically all of the product, he says, is currently sold to overcome industrial maintenance problems—about 50% as a boiler-water treatment, 49% as a cooling-water conditioner, 1% as a glass brightener.

Persuading Is Hard: Getting the customers to try Agava in their troublesome boiler- and water-conditioner systems is Spray's biggest problem. But the firm's philosophy is "The harder it is to get a customer, the better he is in the long run. We like to sell the big accounts, because it means the little ones will follow. And once they've used our product, we never lose them."

Macy's department store is Agava's largest customer—it accounts for over 10% of sales. Other big users are Statler hotels, Chase Manhattan banks, American Stock Exchange and Ideal Farms (a dairy). Some 90% of the company's sales volume is in the Middle Atlantic states.

Frequent Service: The bulk of Agava, about 80%, is sold in 55-gal. drums at $208/drum. As a water treatment, Agava is poured into the system, one part Agava to 500 parts water. Makeup solution: one part Agava to 20,000 parts water. To insure correct usage of Agava, new accounts are serviced often in the first few

over a half century...
SERVING INDUSTRY
THROUGH CHEMISTRY



LOMAR®

POWERFUL
DISPERSING
AGENTS

If your manufacturing process calls for the dispersion of dyes, pigments, clays, graphite, mica, carbon black and other inert powders—you will be interested in the powerful dispersion properties of Lomar—a Napthalene Sulfonic Acid condensate.

Used in cement, plaster, ceramics, in wet milling, in preparation of paint and asphalt emulsions, pitch and slime control in paper industries, for coagulation control of latex, in foundries and as auxiliary tanning compounds, for their high dispersing action.

The versatile Lomar series of dispersion agents are continuing to improve manufacturing processes and finished products in many diverse fields.

If you would like to know more about the LOMAR group, please write for a test sample and complete data sheet. No obligation, of course.

JACQUES WOLF & CO.
Chemicals PASSAIC, N.J.

Plants in: Clifton, N.J., Carlstadt, N.J., Los Angeles, Calif.

months, thereafter once a month. If necessary, installation equipment is also furnished. Agava's three salesmen and four distributors now service more than 800 accounts.

Sales emphasis is on the oil tanker business—two shipping lines are already using Agava in their boiler systems. Because oil tankers require a hefty quantity of Agava for each trip, Spray has developed a solid concentrate to eliminate space and storage problems.

Although emphasis is still on industrial maintenance, Spray and Davis are also trying to interest cosmetics companies in the healing properties of Agava for dermatitis control.

Although Agava is not now available to household users, Spray's plans are to put it on the consumer market as a drain cleaner tagged Clear-A-Drain. Just how Spray will distribute Clear-A-Drain is a problem yet unsolved, but Spray and Davis feel that with Agava's unique cleaning properties, obtaining consumer acceptance won't be hard. One solution may be to merge with an established household product manufacturer, or license Clear-A-Drain.

Spray, in explaining where else Agava might be useful, perhaps strains the credulity of some formulators. He says that Agava, when mixed with a detergent, does the job of a hand lotion. When it's mixed with an insecticide, it doubles the insecticide's killing power, yet renders it totally harmless to the skin. Spray further says, "Agava has proved effective in curing athlete's foot and butcher's dermatitis (hog itch)"—the latter claim is under study now by the U.S. Dept. of Agriculture.

"There are over 169 different chemical compounds in Agava," Spray says. "It contains many enzymes, cholorophyllins, sisal sapoginin, a gum similar to acacia, other gel colloids and sugars. The dominant polysaccharide in the juice is inulin; the dominant fermentable monosaccharide is fructose."

With equipment now in operation, one employee can process 400-600 gal. of agave juice daily. But new equipment soon to be added will boost capacity to 10 times its present level.

Processing agave juice consists of removing the solids (about 14% of the total mixture) and adding other sugar preservatives (usually borax and sodium benzoate.) A quaternary ammonium compound is added for bacteria control.

The solids, containing pectins, steroids, waxes and sugars, far from being waste material, are sought as raw materials by makers of hormones and corticosteroids. Price varies, depending on steroid content—an 8-9% steroid content nets $1,000/ton; a 2% steroid content, $250/ton.

Up to now, Agava Products, which got its start in '49, hasn't made a heavy impact in the specialties world, in spite of generally favorable business conditions. But with help of a new sales manager, Harold Davis, the company hopes to see a giant growth in sales for '58, plans to market over $1.1 million worth of Agava this year. And that's shooting pretty high for a firm that had sales of $50,000 last year.

PRODUCTS

High-Low Catalyst: Latest product from Lucidol Division, Wallace & Tiernan Corp. (Buffalo), is *p*-menthane hydroperoxide, a stable, nonvolatile liquid hydroperoxide for use as a polymerization catalyst. It's claimed to be an effective catalyst in low-sugar redox systems at 5 C and in polyester resin systems at temperatures around 240 F.

•

Artist's Spray: Acrolite Products, Inc. (West Orange, N.J.) is now marketing an odorless artist's fixative in an aerosol container. Acrolite claims it's the first to market an odorless, nonflammable artist's spray that won't wrinkle paper or alter color tones.

•

Pearl Finish sans Fish: Ultra Rayl Pearl Essence Corp. (Hyannis, Mass.) has developed a simulated pearl finish that, it says, equals the brilliance of the natural pearl essence derived from the scales of herring and related fish. Called Ko Pearl, the material can be incorporated in paints, plastic resins, inks and lacquers for application on glass, wood, plastic, leather or metal.

•

Vegetable Helper: A new foliage fungicide, Dyrene (2, 4-dichloro-6-[*o*-chloro aniline] triazine) increases yields per acre 50-100%, according to its manufacturer, Chemagro Corp. (New York). Dyrene is now being

HARSHAW

Production-Controlled High-Quality

FLUORIDES

Boron Trifluoride
Hydrofluoric Acid

ANHYDROUS . . . AQUEOUS

The uses for Fluorides are ever increasing. Harshaw Fluoride production also has increased steadily. Shipments of cylinders, tank trucks and tank cars leave our plant daily. If required, you are invited to draw on the knowledge and experience of our staff of technical specialists on Fluorides.

Write for your free copy of M.C.A. Chemical Safety Data Sheet SD-25 on properties and essential information about . . .

HYDROFLUORIC ACID
Anhydrous and Aqueous

THE HARSHAW CHEMICAL CO.

1945 EAST 97th STREET • CLEVELAND 6, OHIO

Chicago • Cincinnati • Cleveland • Detroit
Hastings-On-Hudson, N.Y. • Houston
Los Angeles • Philadelphia • Pittsburgh

Here is a helpful list of HARSHAW production-controlled high-quality fluorides:

Ammonium Bifluoride
Ammonium Fluoborate
Antimony Trifluoride Sublimed
Barium Fluoride
Bismuth Fluoride
Boron Trifluoride
Boron Trifluoride Complexes
Chromium Fluoride
Copper Fluoborate
Fluoboric Acid
Fluorine Cells
Fluorinating Agents
Frosting Mixtures
Hydrofluoric Acid Anhydrous
Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Metallic Fluoborates
Potassium Bifluoride
Potassium Chromium Fluoride
Potassium Fluoborate
Potassium Fluoride
Potassium Titanium Fluoride
Silico Fluorides
Sodium Fluoborate
Tin Fluoborate
Zinc Fluoborate
Zinc Fluoride

CHEMICAL WEEK • ADVERTISERS INDEX

January 18, 1958

AIR REDUCTION CHEMICAL CO. 77
Agency—G. M. Basford Co.

ALLIED CHEMICAL & DYE CORP. NITROGEN DIV. 5
Agency—G. M. Basford Co.

ALUMINUM CO. OF AMERICA 11
Agency—Ketchum, MacLeod & Grove, Inc.

AMERICAN AGRICULTURAL CHEMICAL CO. 64
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc. Adv.

ATLANTIC REFINING CO. 75
Agency—N. W. Ayer & Son, Inc.

BADGER MFG. CO. ..... 3rd Cover
Agency—F. P. Walther Jr. & Assoc.

BECCO CHEMICAL DIV. FOOD MACHINERY & CHEMICAL CORP. 33
Agency—John Mather Lupton, Inc.

BENDIX AVIATION CORP. 30
Agency—MacManus, John & Adams, Inc.

BLAW-KNOX CO. 61
Agency—Ketchum, MacLeod & Grove, Inc.

BLOCKSON CHEMICAL CO. 10
Agency—Wm. Balsom Adv.

CARRIER-STEPHENS CO. 52

COLUMBIA SOUTHERN CHEMICAL CORP. 51
Agency—Ketchum, MacLeod & Grove, Inc.

DELHI TAYLOR OIL CORP. 41
Agency—Sam J. Gallay Adv.

DISTILLATION PRODUCTS INDUSTRIES DIV. OF EASTMAN KODAK CO. 40
Agency—The Rumrill Co., Inc.

DODGE & OLCOTT, INC. 44
Agency—Caleon Adv., Corp.

DRACCO CORP. 78
Agency—The Jayme Organization, Inc.

DU PONT de NEMOURS & CO., INC. E. I. GRASSELLI DIV. 60
Agency—Batten, Barton, Durstine & Osborn, Inc.

DU PONT de NEMOURS & CO., INC. E. I. POLYCHEMICALS DIV. 70-71
Agency—Batten, Barton, Durstine & Osborn, Inc.

EASTMAN CHEMICAL PRODUCTS, INC. 81
Agency—Fred Wittner Adv.

ESSO STANDARD OIL CO. 16
Agency—McCann-Erickson, Inc.

FULLER CO., THE 34
Agency—O. S. Tyson & Co., Inc.

GAYLORD CONTAINER CORP. DIV. OF CROWN ZELLERBACK CORP. 9
Agency—Oakleigh R. French & Assoc., Inc.

GENERAL AMERICAN TRANSPORTATION CORP. WIGGINS DIV. 6
Agency—Edward H. Weiss & Co.

GOODYEAR TIRE & RUBBER CO. 1
Agency—Kudner Adv. Agency

GROSS & CO., A. 76
Agency—G. M. Basford Co.

HARSHAW CHEMICAL CO. 91

HERCULES POWDER CO. 36-37
Agency—Fuller & Smith & Ross, Inc.

HEYDEN NEWPORT CHEMICAL CORP. ..... 4th Cover
Agency—O. S. Tyson & Co., Inc.

HOOKER ELECTROCHEMICAL CO. 73
Agency—The Rumrill Co., Inc.

INTERNATIONAL SALT CO., INC. 63
Agency—Batten, Barton, Durstine & Osborn, Inc.

JEFFERSON LAKE SULPHUR CO. 93
Agency—Bauerlein Adv., Inc.

LIQUID CARBONIC CORP., THE 47
Agency—Fletcher D. Richards, Inc.

LUCIDOL DIV. OF WALLACE & TIERNAN INC. 86
Agency—Barber & Drullard, Inc.

MCGRAW-HILL BOOK CO. 58

METASAP CHEMICAL CO. A NOPCO SUBSIDIARY 72
Agency—Gray & Rogers Adv.

MICHIGAN CHEMICAL CORP. 88
Agency—Wesley Aves & Assoc.

MODERN WELDING CO. 29
Agency—Mitchel WerBell, Adv.

MORTON SALT CO., OJIBWAY DEVELOPMENT LIMITED 4
Agency—Needham, Louis & Brorby, Inc.

NATIONAL ALUMINATE CORP. 74
Agency—Armstrong Adv., Agency Inc.

NATIONAL ANILINE DIV. ALLIED CHEMICAL & DYE CORP. 85
Agency—James J. McMahon, Inc.

ORONITE CHEMICAL CO. 19
Agency—L. C. Cole Co.

PENICK & CO., S. B. 2
Agency—James J. McMahon Adv.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP. 86
Agency—Downing Industrial Adv., Inc.

PFAUDLER CO., THE 56-57
Agency—The Rumrill Co., Inc.

PHELPS DODGE REFINING CORP. 46
Agency—The House of J. Hayden Twiss

PITTSBURGH COKE & CHEMICAL CO. 45
Agency—W. S. Walker Adv., Inc.

PROTECTIVE LINING CORP. 13
Agency—Allan Rock Adv. Agency

REICHHOLD CHEMICALS, INC. 53
Agency—MacManus, John & Adams, Inc.

RICHARDSON SCALE CO. 50
Agency—O. S. Tyson & Co., Inc.

RUBBER CORP. OF AMERICA 93
Agency—Ovesey & Straus, Inc.

SHELL CHEMICAL CORP. ..... 2nd Cover
Agency—J. Walter Thompson

SUN OIL CO. 7
Agency—Erwin Wasey-Ruthrauff & Ryan, Inc.

TEXAS GULF SULPHUR CO. 8
Agency—Sanger, Funnell Inc.

TOTE SYSTEMS, INC. 84
Agency—Ayres, Swanson & Assoc., Inc.

UNION BAG-CAMP PAPER CORP. 68
Agency—Smith, Hagel & Knudsen, Inc.

UNION CARBIDE CHEMICALS CO., DIV. OF UNION CARBIDE CORP. 14, 94
Agency—J. M. Mathes, Inc.

VOGT MACHINE CO., HENRY 39
Agency—Farson, Huff & Northlich, Adv.

WARWICK WAX CO. DIV OF SUN CHEMICALS CORP. 12
Agency—G. M. Basford

WESTVACO CHLOR-ALKALI DIV. OF FOOD MACHINERY & CHEMICAL CORP. 59
Agency—James J. McMahon, Inc.

WINTHROP LABORATORIES, INC. 67
Agency—Thompson-Koch Co.

WITCO CHEMICAL CO. 20-21
Agency—Hazard Advertising Co.

WOLF & CO., JACQUES 90
Agency—Reidl & Freede, Inc.

WYANDOTTE CHEMICAL CORP. 62
Agency—Brooke, Smith, French & Dorrance Inc.

tracers SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.

CHEMICALS Offered Wanted 95

EMPLOYMENT 95

EQUIPMENT: Used Surplus New For Sale 95

WANTED 95

MANAGEMENT SERVICES 95

SPECIAL SERVICES 95

ADVERTISING STAFF

Atlanta 3 Robert H. Powell, 1301 Rhodes-Haverty Bldg., JAckson 3-6951

Boston 16 350 Park Square Building, Paul F. McPherson, HUbbard 2-7160

Chicago 11 Alfred D. Becker, Jr., R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

Cleveland 15 Vaughn K. Dissette, 1510 Hanna Bldg., SUperior 1-7000

Dallas 1 George Miller, The Vaughn Bldg., 1712 Commerce St., RIverside 7-5117

Denver 2 J. Patten, 1740 Broadway, ALpine 5-2981

Detroit 26 856 Penobscot Bldg., H. J. Sweger, Jr., WOodward 2-1793

London H. Lagler, McGraw-Hill House, 95 Farrington St., E.C. 4, England

Los Angeles 17 John B. Uphoff, 1125 West Sixth St., MAdison 6-9351

New York 36 Knox Armstrong, B. A. Johnson, P. F. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 William B. Hannum, Jr., Architects Bldg., 17th & Sansom Sts., Rittenhouse 6-0670

Pittsburgh 22 V. K. Dissette, Room 1111 Henry W. Oliver Bldg., ATlantic 1-4707

San Francisco 4 William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 3615 Olive St., Continental Bldg., R. J. Claussen, JEfferson 5-4867

pushed for use on potatoes and tomatoes, controlling such diseases as early blight, late blight, anthracnose, septoria leaf spot and gray leaf spot, but its suitability for control of onion, celery and other crop diseases is under test. FDA-tolerances permitted for Dyrene residues are 10 ppm. on tomatoes, 1 ppm. on potatoes. The product is available in 50-lb. drums.

•

Break for Dishes: Hi-Time, a mechanical dishwashing compound designed for heavy-soil loads, has just been added to Calgon Co.'s line of commercial detergents.

•

Paper Coating: A new vinyl-acrylic copolymer coating emulsion, developed especially for the paper industry but also recommended for coating applications in other fields, is being marketed by National Starch Products, Inc. (New York). The new resin, National says, has low viscosity, superior pigment-binding ability, film clarity and mechanical stability. It can be used for all types of coated paper from offset and letterpress stock to lightweight wrapping paper and boxboards.

•

Aerosol for Autos: The first foam-type aerosol paste wax for autos is now being marketed by The Turtle Wax-Plastone Co. (Chicago.) Turtle Wax auto polish is available in a 15-oz. can at a retail price of $2.

•

Canned Metal: Plastic Metal, a new product from A. L. Okun Co., Inc. (New York), is a readily applied repair material for use with most metals, concrete, plastic and glass. It hardens in 30 minutes (at room temperature), can be drilled, threaded, machined, ground, sanded or "feather-edged." It's sold only by Okun, at $5.95 for a 2½-lb. can; $9.75 for a 4½-lb. can.

•

More Chelate Changes: Dow is coming out with a new chelating compound as well as simpler names for its entire chelate line, following last week's price cut on versene chelating agents (*CW Market Newsletter, Jan. 6, p. 47*). The new product is Versenol Z, designed for curing zinc deficiency in avocado orchards or deciduous trees of the Northwest.

Under the new nomenclature, Versenol Iron Chelate will be known as

RC

POLYESTER F-1

A modified glycol-polyadipate specifically designed for reaction with diisocyanates to produce . . .

POLYURETHANE flexible foams & films

SPECIFICATIONS

Acid Number	1.5 Maximum
Hydroxyl Number	58-62
Viscosity, cps. @ 25°C.	10,000-13,000
Color, Gardner	5 Maximum
Sp. Gr., 20/20°C.	1.195±0.005
Moisture, %	0.0

Evaluate RC POLYESTER F-1 in POLYURETHANE cushioning, coatings, thermal insulation, toys, sponges, jacket-liners, carpet underlays, automotive padding, rubber lacquers, wire insulation, and in hundreds of additional applications!

WRITE TODAY! Ask for our technical data sheet on RC POLYESTER F-1. We'll be glad to send you samples!

RUBBER CORPORATION OF AMERICA

READY... RELIABLE... RC SERVING AMERICAN INDUSTRY, SINCE 1930

New South Road, Hicksville 5, N. Y.

Sales Offices: NEW YORK • AKRON • CHICAGO • BOSTON

Men on the Move

Now available in a *new edition* . . . with *new figures.*

This popular booklet points up the important sales problem of personnel turnover in industry. Out of every 1,000 key men (over a 12-month period) 343 new faces appear . . . 65 change titles . . . 157 shift . . . and 435 stay put. These figures are based on average mailing address changes on a list of over a million paid subscribers to McGraw-Hill magazines.

Write us for a free copy

Company Promotion Department

McGraw-Hill Publishing Co., Inc.

330 West 42nd Street,
New York 36, New York

SULPHUR

• HIGHEST QUALITY
99.5% Minimum purity

• CONVENIENT DELIVERY
Available in Crude, Bulk, Liquid

• DEPENDABLE LOW-COST SUPPLY

Mines at three locations on the Gulf Coast, Plants in Wyoming and at Fort St. John, British Columbia

JEFFERSON LAKE SULPHUR COMPANY

Domestic Sales Offices
Prudential Bldg.
Houston 25, Texas

20 uses
FOR
UCON
BRAND
Fluids and Lubricants

- Hydraulic fluids
- Fire-resistant hydraulic fluids
- Gear lubricants
- High-temperature lubricants
- Low-temperature lubricants
- Rubber lubricants
- Packing lubricants
- Compressor and Pump lubricants
- Lift-truck lubricants
- Metal-working fluids
- Heat-transfer fluids
- Grease components
- Textile lubricants
- Defoamers
- De-emulsifiers
- Cosmetic components
- Ink and Dye diluents
- Leather softeners
- Solvents and Plasticizers
- Chemical intermediates

These polyalkylene glycols and derivatives are available in both water-soluble and water-insoluble series, with or without additives. Viscosities of UCON fluids and lubricants range from 50 to 90,000 S.U.S. at 100° F.

UCON fluids and lubricants have a record of proved performance. Find out what they can do for you. Write for booklet 6500.

UNION CARBIDE CHEMICALS COMPANY
Division of UNION CARBIDE Corporation
30 East 42nd Street, New York 17, N.Y.

"Ucon" is a registered trade-mark of UCC.

Versenol F; Versonol Iron Chelate on Vermiculite will be Versenol FA; Versene Iron Chelate will be Versene F; Versene Iron Chelate on Vermiculite will be called Versene FA.

•

Stripe Goes National: This month, Lever Brothers is swinging its pink-and-white-striped toothpaste into distribution in additional states. The product, called Stripe, will go on sale in New York, Illinois and Wisconsin. Stripe, the first toothpaste to contain hexachlorophene, is already available in Michigan and northern Ohio.

•

Whiter Nylon: A new optical brightening agent for polyamide fibers such as nylon is being introduced by Sandoz, Inc. (New York). It's called Leucophor PA.

•

Hard-Water Germicide: Rohm & Haas is now producing its quaternary ammonium germicide, Hyamine 3500, in commercial quantities. Chemically, the material is N-alkyl (C_{14} C_{12} C_{16}) dimethyl benzyl ammonium chloride, is a water-white liquid at room temperature, is said to have good cold stability. Use of the material allows formulation of liquid sanitizers that will meet requirements of the Federal Milk Code & Ordinance in waters of 550-ppm. hardness.

•

Silicone Varnish: Union Carbide's new varnish (R-610 Silicone), developed for coating and bonding Class H electrical insulation components, is now commercially available. Carbide claims that its new varnish has exceptional retention of flexibility and keeps 90% of its original dielectric strength even after seven days' exposure at 275 C. The new product contains 65% silicone solids in xylene and has a viscosity of 75-175 centipoises.

New Arrival at Grand Central

Chas. Pfizer & Co. is the latest chemical maker to tell the public its story at the Investment Information Center of Merrill Lynch, Pierce, Fenner & Beane at New York's Grand Central Station. In addition to the process control tests, the Pfizer exhibit features a description of its fermentation processes and tableting operations. As many as 10,000 persons visit the exhibit daily. Inspecting the exhibit above are Michael W. McCarthy, of Merrill Lynch, and John E. McKeen, president of Pfizer.

EMPLOYMENT OPPORTUNITIES

CHEMICAL SALES TRAINEES

Do you want to sell petrochemicals to the chemical industry?

Have you obtained at least a B. S. Degree in chemistry or chemical engineering within the last three years?

Do you have the confidence to move ahead rapidly if given the opportunity?

If you can answer "Yes" to these three questions, you may be one of the few top-notch men we're seeking for our sales training program.

We are a completely integrated chemical subsidiary of one of the major oil companies. We were organized early this year, provided with capital and instructed to grow. We are looking for men who have the desire and ability to grow with us.

If you believe you qualify, send complete details of age, education and experience to:

G. D. Ritter
Amoco Chemicals Corp.
910 S. Michigan Avenue
Chicago, Illinois

We will reply promptly and in confidence.

MANAGEMENT SERVICES

- General Consulting
- Management
- Patents
- Systems Engineering
- Instrumentation
- Equipment Design
- Catalyst Development
- Translation
- Chemical & Bacteriological Analysis

Clark Microanalytical Laboratory

CH, N, S, Halogen, Fluorine, Oxygen, Alkoxyl, Alkimide, Acetyl, Terminal Methyl, etc, by specialist in organic microchemical analysis.

HOWARD S. CLARK, DIRECTOR
P. O. Box 17 Urbana, Ill.
EMpire 7-8406

The Heyward-Robinson Company
ENGINEERS • CONSULTANTS • CONSTRUCTORS
*Chemical
*Metallurgical
*Industrial Buildings
114 LIBERTY STREET, NEW YORK 6, N.Y.

JACOBS ENGINEERING COMPANY
CHEMICAL ENGINEERS
Chemical plant design. Feasibility and Market studies.
Specialists in Pacific Coast chemical industry.
774 East Green Street Pasadena, Cal.

JAMES P. O'DONNELL
Consulting Engineer
Professional Engineering for the Petroleum and Process Industries
39 Broadway
New York 6, N. Y.
Beaumont, Texas

SIRRINE
ENGINEERS
Plant design & Surveys covering Chemical Electrochemical and Metallurgical Production; Industrial Waste Disposal; Water Supply & Treatment Analysis & Reports
J. E. SIRRINE CO.
Greenville South Carolina

PETROLEUM ADDITIVES SALES

Sales of our established petroleum additives are growing rapidly, and we will introduce new products during 1958. We must add several graduate engineers for sales positions in this field immediately. Our status as a completely integrated chemical subsidiary of one of the largest oil companies in the U. S. assures the necessary support for our extremely rapid expansion in the petrochemical field. It also assures excellent job security and liberal benefit programs. Because of this, we offer an unexcelled opportunity to men who have the right combination of initiative, education and experience. A degree in chemical or mechanical engineering and 2-5 years' experience selling organic chemicals to industry or selling products to the automotive engine field are required. Maturity and self-motivation are essential. If you have these qualifications and are looking for this kind of challenging opportunity, send complete details of age, education and experience to:

G. D. Ritter
Amoco Chemicals Corp.
910 S. Michigan Avenue
Chicago, Illinois

Replies confidential.

CHEMISTS OR CHEMICAL ENGINEERS

Openings for Chemists or Chemical Engineers in Development Laboratories of large midwestern company to work in fields of latex and urethane foams. Experience in formulating urethane foams particularly desired.

INLAND MANUFACTURING DIVISION
General Motors Corporation
Dayton, Ohio

REPLIES (Box No.): Address to office nearest you
c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

Positions Wanted

Executive-type salesman, B.S., Age 30, desires affiliation with firm in chemical or allied field for relocation in Houston area or So. Calif. Now in Chicago area. PW-7006, Chemical Week.

Chemical Engineer: Diversified experience in petroleum, insecticides, resins, pharmaceuticals, and textiles. Successful in unusual process problems in every employment. Seeks permanent challenging opportunity with reliable firm, with top management growth possibility. Member Amer. Management Ass'n. Age 42. PW-7032, Chemical Week.

Position Vacant

Opening for research and development chemist experienced in the manufacture and various uses of protective coatings, wax, wax compounds, resins, polymer dispersions, plastic, and bituminous materials in industrial manufacturing company laboratory located in Middle West. Apply by letter giving full details of education and experience. All replies will be confidential. P-5213, Chemical Week.

Position Wanted

Ph.D Chemical Engineer with fifteen patents publications and ten years Research Development experience desires position. PW-6730, Chemical Week.

TRACERS
TO THE CHEMICAL PROCESSING INDUSTRIES

For Sale

Bird 24" x 36" Continuous Centrifugal, 30 HP, late model. Perry, 1415 N. 6th St., Phila. Pa.

Mikro Pulverizer #2DH, stainless steel, 10 HP. Perry, 1415 N. 6th St., Phila. 22, Pa.

Raymond #15 Supermill, 6 roller, 66" dia. Perry, 1415 N. 6th St., Phila. 22, Pa.

Wanted

Wanted—Beckman Spectrophotometer, Model DU, used. Please describe condition and indicate price desired. Write Hardwood Chemical Co., P.O. Box 163, Buffalo 5, New York.

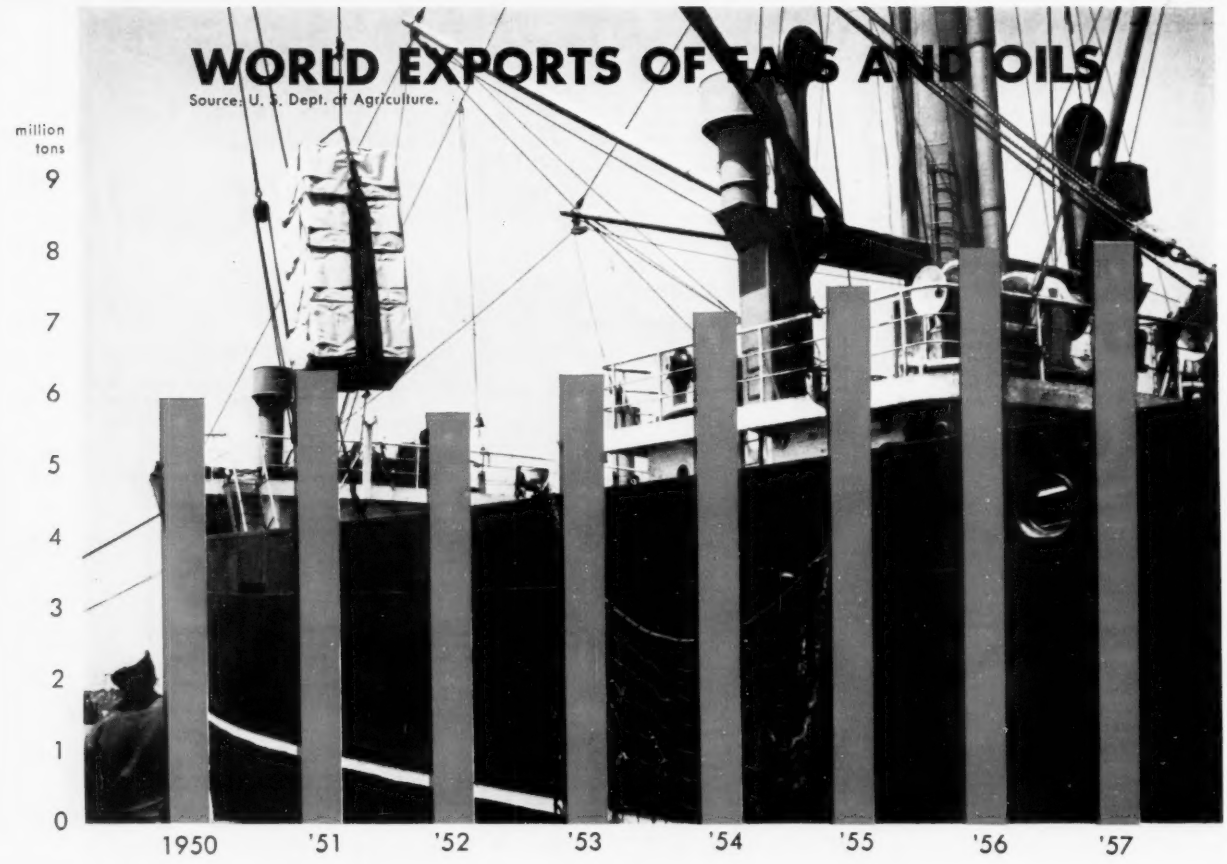
Business Opportunity

Franchises Available: Organic peroxide manufacturer offering franchises in East, South and some Midwest areas. Ideal addition to plastic chemicals or polyester resin-fiberglass line. Lucrative, quality products by expanding concern. Distributor please state related lines carried, sales force and territory. BO-6774, Chemical Week.

NDI COORDINATED RESEARCH NEW DRUG INSTITUTE
TOXICITY TESTS following FDA procedures, for chemicals, foods, drugs, cosmetics, pesticides, additives. Biological assays. Screening tests. Complete research and development services. No obligation for estimates. Call or write Arthur D. Herrick, Director.
NEW DRUG INSTITUTE
130 East 59 St., New York 22 • Mu 8-0640

SURPLUS WANTED
CHEMICALS, PHARMACEUTICALS, OILS PLASTICIZERS, RESINS, DYES SOLVENTS, PIGMENTS, ETC
CHEMICAL SERVICE CORPORATION
96-02 Beaver Street, New York 5, N. Y.
HAnover 2-6970

BUYERS OF CHEMICALS
CHEMICALS—OILS—SOLVENTS
DRUGS—RESINS—WAXES
PLASTICS—COLOR—ETC.
BARCLAY CHEMICAL COMPANY, INC.
75 Varick Street New York 13, N. Y.
WORTH 4-5120



U.S. Exports 30% of World Fats and Oils

World exports of fats and oils were at an all-time high of 8.2 million tons (oil equivalent basis) last year. This is only a slight increase over the '56 export record of about 8 million tons, but it's more than double post-war average yearly shipments.

Greatest changes in the fats and oils export pattern last year: a sharp drop in cottonseed oil shipments and heavy movement of flaxseed and linseed oil. U.S. cottonseed exports have accounted for over 75% of total cottonseed and cottonseed oil that entered world trade channels in the last three years.

A major exporter of fats and oils, the U.S. shipped some 2.5 million tons to foreign shores in '57, about one-third of total world exports of these products. In '56, the U.S. shipped about 2.4 million tons, a 30% slice of the market.

Estimated world production of fats and oils is about 30.4 million tons for '57, nearly 0.4 million tons more than in '56, and a record high for the fourth successive year.

There were increases in all five major categories: edible vegetable oils, palm oils, industrial oils, animal fats, marine oils. The U.S. accounted for some 24% of total world output in '57, some 7.4 million tons.

from the first large-scale $NaBH_4$ *plant comes a basic ingredient for*

ZIP FUELS

Badger constructs new Metal Hydrides plant from site clearance to start-up. This new plant is among the first to produce $NaBH_4$, an important ingredient of "exotic fuels" for trans-sonic devices, on a large scale. From site clearance to initial start-up, Badger handled the complete equipment engineering and construction for the project.

While the characteristics of sodium borohydride make it fine for high performance fuels, its production creates real problems in equipment and plant design. How well did Badger meet and solve these problems?

Officials and engineers at Metal Hydrides have said they were impressed by the proven ability of Badger personnel and by the intelligent approach that was brought to MHI's problem. In addition, Badger was complimented for its willingness to undertake the project on a "crash" schedule. Metal Hydrides' judgment proved sound when Badger delivered the plant on schedule in spite of delays due to the steel strike.

Each year more and more leading firms with unusual and pioneering engineering projects choose Badger. The ability and experience that lead so many to the same choice can pay off on your projects, too. Why not inquire?

The Badger Key Man

FROM INITIAL NEGOTIATIONS TO "ON STREAM" YOU DEAL WITH A BADGER PRINCIPAL. *Badger Engineering Projects are group efforts headed by a Key Man. More than just a sales engineer, he is always a Badger principal — always the Key Man in the execution of the project.*

By channeling project liaison, coordination and administration through a widely experienced company principal, you find many policy level decisions can be made on the spot. Investigate what Key Man Policy can mean to the projects you are planning.

BADGER

MANUFACTURING COMPANY

ENGINEERS • CONTRACTORS • DESIGNERS • MANUFACTURERS

230 Bent St., Cambridge, Mass.

New York, N.Y. • Houston, Texas

IN EUROPE: Badger-Comprimo N.V., The Hague

Badger-Comprimo S.A., Antwerp

Aerial view of Metal Hydrides' new Sodium Borohydride Plant at Danvers, Massachusetts, as it looked while under construction. The plant process involved the preparation of sodium borohydride using sodium and boric acid as raw materials.

From Heyden Newport

This new facility is now on stream producing pentaerythritols at Fords, N. J., adding its capacity to that of Heyden Newport's plant at Garfield, N. J.

PENTAERYTHRITOL

AS YOU LIKE IT

With its new Fords, N. J. plant on stream, Heyden Newport is now in an even better position to furnish pentaerythritols in the quality and quantity you want.

These additional facilities, incorporating knowledge gained from long experience in producing pentaerythritol and the most up-to-date research and engineering advances, will help to meet industry's growing needs for these versatile polyols . . . will assure prompt delivery of pentaerythritols of highest quality and uniformity to match your specifications.

Choose from Pentek® (Pentaerythritol Technical), the "all-purpose" polyol for general resin formulating, or Monopentek® (Monopentaerythritol) for alkyd resins of lower or special viscosity requirements. Dipentek® and Tripentek® complete the series available from Heyden Newport.

A new 56-page Pentek brochure describes the great variety of uses for this polyol. For your copy of this valuable technical reference, write on your letterhead to Heyden Newport Chemical Corporation, 342 Madison Avenue, New York 17, N. Y.

HEYDEN NEWPORT

Where tradition meets tomorrow in chemical progress